Egypt. J. Vet. Sci. **(special issue)**, pp. 105-113
The Scientific Conference of Kafr Elsheikh University
(One World.....One Health, 5th– 8th October 2022)

Egyptian Journal of Veterinary Sciences
https://ejvs.journals.ekb.eg/

Performance of Lactating Buffaloes as Affected by Partial Substation of Berseem by Maize and Maize Teosinte Hybrid Silage During Winter Season in Egypt.

Srour A. Abdelhmeed[1], Said A. Mahmoud,[2] Nabil M. Eweedah[2*] and Mahmoud M. Bendary[3]

[1.] *Production Sector, Agriculture Research Center, Egypt..*
[2.] *Animal production, Department. Facult, Agriculture. Kafr El-Sheikh University, Egypt.*
[3.] *Animal Production, Research Institute, Agriculture Research Center,Egypt.*

NINE lactating buffaloes between 2nd and 5th of lactating season , weighting 550-650 kg used after 6-8 weeks of calving through "Swing-over design" to study the performance of lactating buffaloes as affected by partial replacement of fresh berseem (FB) by maize silage (MS) or maize teosinte hybrid silage (THS). Control ration (CR) contained: 9.0% concentrate feed mixture (CFM) + 66.0% fresh berseem (FB) + 25.0% rice straw (RS). TRI contained: 15.0 % CFM + 35% FB + 20.0 % RS +30 % MS. While TR2 contained 15.0% CFM + 34.0% FB+20.0%RS+31.0% THS. Results indicated that all of the experimental rations were nearly similar expect DM and NFE. The differences in milk yield between CR and TR2 were a highly significant while no significant differences between both the TR1 and TR2 groups. There were no significant differences in all milk contents. The feed intake of DMI, TDNI and DCPI were nearly similar. Buffaloes fed TR1 and TR2 recorded the best feed efficiency compared with CR. The net revenue increased by feeding TRI and TR2. The inclusion of MS and THS in traditional winter rations led to increase daily yield of 7.0% FCM compared with control group, improve economic efficiency and could be save about 50% of FB produced which can be conserve it as silage or hay reduce cultivated berseem area by 53.75% to increase wheat production.

Key words: Maize Silage, Teosinte hybrid silage, Berseem, Lactating Buffalo, Milk.

Introduction

In Egypt, berseem is the main forage crop fed almost at *ad libitum* level as a common practice in winter season. Feeding berseem with narrow caloric protein ratio usually covers 96% of energy and 177% of protein requirements of animal's population [1]. Consequently, animals would cover some significant amounts of their energy requirements through hepatic gluconeogenesis. On the other hand, excretion an excessive amount of nitrogen as urea led to be lost through nephritic system [2]. Moreover, the wide Ca: P ratio in berseem (6-10/1) would upset the balance, depress gastrointestinal absorption of such minerals and may reduce the reproductive performance and induce parturient paresis [3].

Maize silage plays an important role as a main feed resource in the livestock industries for many countries. The main reasons for popularity of maize for silage purpose are the high crop yield, it can be easy ensiled and its high energy value as a feed [4]. The production of forages in sufficient quantity and quality throughout the year becomes a necessity in all production systems that aim at higher productivity and enhance milk and meat production at considerably low cost, and partially fill the gap in protein and energy shortage. Thus, ensilage forages have been used as an alternative in fodder preservation with view to greater productivity and animal performance. Therefore, the development of the Egyptian agriculture must move to efficient and more demanded production systems to increase competitiveness and ensure sustainability [5]. This study was conducted to investigate the performance of lactating buffaloes as affected by partial replacement of fresh berseem by maize and maize teosinte hybrid silages compared with feeding traditional winter rations in Egypt.

*Corresponding author: Eweedah N. Mohamed, E-mail: eweedahnabil@gamil.com. Tel.:00201001343545
(Received 15/10/2023, accepted 19/10/2023)
DOI: 10.21608/EJVS.2023.242795.1644

Material and Methods

The present study was carried out at Mehallet-Mousa, Animal Production Research Station, Kafr EL-Sheikh Governorate belonging to Animal Production Research Institute (APRI), Agriculture. Research. Center, Ministry of Agriculture. Egypt.

Making silage

Maize and teosinte hybrid crops were harvested at the dough stage of maturity at 95 and 115 days of age for maize and maize teosinte hybrid crops, respectively. Whole plants of each crop were chopped (1.5-2.5 cm of length) using a Holland chopping machine. Then, each kind of fresh plant was filled layer by layer (about 50 cm height) and the wheel of a farm tractor was used to ensure good pressing and packing of silage. When the silo was filled, it was tightly covered by plastic sheet then covered by approximately 20 cm layer of soil to get anaerobic conditions and ensiled for two months until starting started feeding lactating buffaloes. Color and odor were examined, and samples were taken from each silage for chemical analysis and quality determination before starting feeding trials.

Experimental animals and rations

Nine lactating buffaloes between 2nd and 5th of the lactation season, and weighing 550-650 kg were used after the peak period at 6-8 weeks of calving. The buffaloes were free from any disease with normal healthy appearance and were housed individually under open sheds. A swing over design as described by Darwish *et al.* [6] was applied in this work it allows comparison of different rations with individual animals at four successive periods

TABLE 1. Formulation of the experimental rations for lactating buffaloes (on DM basis).

Ingredients %	CR	TR1	TR2
Concentrate feed mixture (CFM) *	9.00	15.00	15.00
Fresh berseem (FB), 2nd and 3rd cut FB	66.00	35.00	34.00
Rice straw (RS)	25.00	20.00	20.00
Maize silage (MS)	---	30.00	---
Teosinte hybrid silage (THS)	---	---	31.00
Total	100	100	100

*Concentrate feed mixture (CFM) consisted of yellow corn 45%, wheat bran meal 22%, soybean meal 12% sunflower 18% Limestone 1.8%. Common salt 0.8% and mineral salt 0.4%.

The control ration (CR) was given in the first period, followed by two tested rations, in the second and third, then back to the control ration in the fourth period**.** Animals were fed the following experimental rations on DM basis: control ration (CR) that represented the winter traditional ration in Egypt and consisted of 9.0% concentrate feed mixture (CFM) + 66.0% fresh berseem (FB) + 25.0% rice straw (RS).

The 1st tested ration (TR1) contained 15.0% CFM + 35.0 % (FB) + 20.0% rice straw (RS) + 30.0 % Maize silage (MS). While, the 2nd tested ration (TR2): contained 15.0% CFM + 34.0% (FB) + 20.0 % rice straw (RS) + 31.0% maize teosinte silage (THS) as shown in Table (1).

The animals were individually fed according to Paul *et al.,* [7] requirement of lactating buffaloes. Rations were adjusted every week according to live body weight and milk production. The CFM was offered one's time daily at 7 a.m. during the experimental periods for all animals. While berseem and rice straw were offered *ad lib* to the animals in the control at 8 a.m. while the animals in the 2nd and 3rd groups had offered berseem mixed with rice straw at 8 a.m. and silages at 12 a.m.

Fifty grams of sodium bicarbonate as a buffer was mixed with CFM daily for each buffaloes in all tested groups. Buffaloes were watered three times daily at 7, 12 a.m. and 4 p.m.

Determine of silage quality

Samples of silage were taken for testing the silage quality: pH value was determined by using Orian 680 digital pH meter, Ammonia– nitrogen total volatile fatty acids (TVFA's) and Lactic acids concentration were determined according to the methods of **Analytical Chemistry of foods** [8].

Samples of forages and silages

Representative samples were taken from each chopped forage crop before and after ensiling. Samples were dried in a forced air oven at 65°C for 48 hr. to determine preliminary (DM) content for each crop and its silage. Then ground and kept for chemical analysis.

Chemical analysis and nutritive values

Chemical analysis of fresh forage crops and silages samples were carried out according to the methods of AOAC [9] .While, NFE values were calculated by difference. The total digestible nutrient

(tdn) and digestible crude protein were calculated using the equations by Wardeh **[10].**

DCP for CR = -2.9198+ 0.8729 X (CP %)

TDN for TR1and TR2 =4.2838+0.9413× (CP %)

TDN for CR = 75.2671-0.6114× (CF %)

TDN for TR1and TR2 = 87.4555- 0.8741× (CF %)

Composite milk samples from consecutive morning and evening milk were taken once every week during the middle of collection period, samples were mixed in a proportion to yield and analyzed for fat**,** protein, lactose, solids not fat (SNF), and total solids (TS) by Milko scan, model 133B in Sirsi Road-India.

Feed conversion

Feed conversion expressed as the amount of DM, TDN and DCP required for producing 1kg of 7% FCM and were calculated according to the average daily intake of these items and milk yield.

Economic efficiency

Economic efficiency of using tested feedstuffs was calculated as the ratio between the price of produced milk and the cost of feed consumed based on the following prices: Fresh milk (10LE/kg), CFM 6 LE/kg),FB (0.5 LE/kg), RS (0.5LE/kg), MS 0.65LE/kg) and THS (.045 LE/kg).

Statistical analysis

The data obtained from the present study were subjected to statistical analysis according to Darwish et al., [6] and SPSS [12]. Differences among

Milk yield and composition

Individually morning and evening milk yields were recorded daily, the 7% fat corrected milk (FCM) for each buffalo was calculated using the formula given by Raft and Saleh [11] as follows:

7% FCM = 0.265 milk yield +10.5 fat yield.

treatments were tested by the Multiple Range Test of Duncan [13].

Results and Discussion

Quality characteristics of tested silages

The present results indicated that the quality of the two tested silages were free from moldy characterized with suitable fermentation characteristics, yellowish green color and good smell. The pH value of each experimental silage was 3.83 and 3.95 for MS and THS, respectively as shown in **Table (2).** These values indicated that a good quality of both silages and within the range of good quality silage as reported by Ranjhan [14] designated that pH of good silage could be less than 4.2 or 4.5.Total VFA's concentration in the tested silages (1.92 to 2.14) for MS and THS, respectively Table(2), which indicated that an acceptable silage fermentation. The obtained values of lactic acid concentration (4.18 to 5.20% of DM indicated the good quality silages as recommended by Chatterjee *et al.,* [15]. Accepted values of Ammonia–nitrogen concentration were ranged from 4.30 to 5.39 [14] recommended that NH3-N concentration of total-N for good quality silage should be not more than 10-12%.

TABLE 2. Quality Characteristics of the tested silages

Item	pH	Lactic acid% of DM	Total VFA's% of DM	NH3-N%of Total-N
MS	3.83	4.18	2.14	5.39
THS	3.95	5.20	1.92	4.30

Chemical composition of experimental feedstuffs and rations

Table (3) cleared that the animals which fed an excellent quality forage (FB, MS and THS). However, FB contained higher CP % and ash% but lower NFE % compared with MS and THS. Meantime, the CF and EE content of FB, MS and THS were nearly similar. Calculated that the composition of all experimental rations were nearly similar.

Using both FB and MS or THS with CFM (TR1 and TR2) formed a balanced rations of suitable caloric/protein ratio compared with the 1st ration as shown in **Table (3).** This was confirmed by the fact that the FB had a high CP% while MS and THS had high energy content.

TABLE 3. Chemical composition of experimental feedstuffs and rations.

Ingredient	DM	Composition of DM %					
		OM	CP	EE	CF	NFE	Ash
CFM	88.5	93.05	17.50	3.71	15.96	55.88	6.95
FB2nd cut	17.20	86.17	16.62	2.29	24.00	43.26	13.83
FB3rd cut	20.39	86.50	16.80	2.55	28.80	38.35	13.50
RS	92.65	83.65	3.25	1.58	38.30	40.52	16.35
MS	25.53	92.68	8.80	2.31	26.48	55.09	7.32
THS	28.52	91.98	7.83	2.45	26.48	55.22	8.02
Average calculated composition of experimental winter ration on DM basis.							
CR	25.96	86.06	11.50	2.10	27.71	44.75	13.94
TR1	30.56	88.76	11.19	2.59	27.84	47.08	11.30
TR2	31.60	88.81	10.83	2.55	27.82	47.61	11.19

CFM: - Concentrate feed mixture FB 2nd : Fresh berseem second cut
FB3rd :Fresh berseem third cut MS: Maize silage THS: Maize teosinte hydride silage.

Nutritive values of the experimental rations

Nutritive values expressed as TDN and DCP on DM basis for the different rations used **(Table 4)** were ranged from 58.32 to 67.28% for TDN and 5.92 to 7.13% for DCP. Using FB with great quantity (nearly *ad lib* feeding) increased DCP and decreased TDN in the control ration (CR) compared with 1st and 2nd tested rations which contained MS and THS. Generally, the present nutritive values are mainly associated to the chemical composition and proportion of the experimental feedstuffs, in particular of MS, and THS, as shown in Tables 1 and 2 which were in agreement with El-Aidy [16] with feeding lactating buffaloes rations contained berseem and maize silage along with CFM and RS.

TABLE 4. Calculated of nutritive values of experimental rations.

Items	CR	TR1	TR2
Nutritive value as fed (%)			
TDN	15.14	20.56	20.90
DCP	1.85	1.91	1.87
Nutritive value on DM basis (%)			
TDN	58.32^{b}	67.28^{a}	66.14^{a}
DCP	7.13^{a}	6.25^{b}	5.92^{b}

a and b: Means in the same raw with different superscripts differ significantly ($p<0.05$).

Feed intake

All the experimental buffaloes fed the different rations consumed nearly similar amounts of DM ranging from 17.42 to 18. 01 kg/head/day Concerning TDN intake ration contained THS (TR2) recorded the highest value of TDNI (11.91kg) followed by TR1 contained MS (11.72kg), while CR showed the lowest value (10.24Kg).Concerning CP intake, the values scored were nearly similar, being 2.02, 1.95 and 2.06 kg/head /day for the 1st, 2nd and 3rd rations, respectively **(Table5)**.

The intake of DCP for all rations ranged between 1.07 and 1.25 kg /head /day. This reflected in slight decrease in the daily feed intake as CP form the three tested rations.

The data indicated also that all buffaloes fed the different tested rations were consumed more than their recommended allowances of CP and DCP according to Paul et al., **[7]** requirement of lactating buffaloes as the result of including FB in all tested rations which characterized with high CP content. The present results indicated also that using such high-quality forages increased roughage to 85 and 90% and decreased concentrate feed mixture (CEM) to 10 and 15%.

TABLE 5. Average daily feed intake as fed and on DM basis from the experimental rations.

Items	Experimental rations		
	CR	TR1	TR
Average daily feed intake (kg/day/head) as fed			
Concentrate feed mixture (CFM)	2.00	3.00	3.00
Fresh berseem 2nd cut (FB2)	60.00	--	--
Fresh berseem 3 rd cut (FB3)	--	30.00	30.00
Maize silage (MS)	--	20	--
Teosinte hybride silage (THS)	--	--	20.00
Rice straw (RS)	6.00	4.00	4.00
Total	68.00	57.00	57.00
Average daily feed intake (kg/day/head) on DM basis			
Concentrate feed mixture (CFM)	1.77	2.66	2.66
Fresh berseem 2nd cut (FB2)	10.32	--	--
Fresh berseen 3nd cut (FB3)	--	6.12	6.12
Maize silage (MS)	--	5.11	--
Teosinte hybride silage (THS)	--	--	5.70
Rice straw (RS)	5.56	3.53	3.53
Total intake as DM (kg/day/head)	17.65	17.42	18.01
Total intake as TDN (kg/day/head)	10.24	11.72	11.91
Total intake as CP (kg/day/head)	2.02	1.95	1.95
Total intake as DCP (kg/day/head)	1.25	1.09	1.07
Roughage: concentrate ratio	9:1	8.5: 1.5	8.5: 1.5

Milk production and composition

Average daily milk yield and 7% FCM of buffaloes fed different ration are shown in Table (6). The present results revealed that, incorporation of MS and THS in the tested rations TR1 and TR2 improved the average daily actual milk yield and average daily 7% FCM binge 12.06, 13.02 kg/head/day and 11.70 and 13.13/kg/head/day, respectively compared to control 10.89 and 10.38 kg/head/day.

The differences among TR1and TR2 and between control ration (CR) and TR1 were not significant, while statistical analysis showed a significantly differences ($P<0.05$) between control ration (CR) and the 2nd tested ration (TR2).This may have been because the buffaloes in TR1 and TR2 received their recommended nutrient allowances [7] and because at about that level the buffaloes were produced as much as they were capable off.

Results revealed also, that the average of actual daily milk yield and 7% FCM for successive treatments appeared to be more affected by TDN intake it was noticeable that TR1 and TR2 consumed 11.72 and 11.91 kg, respectively daily were the highest averages of actual milk yield and 7% FCM yield compared with feeding 10.24kg TDN /day in CR (Table**,** 5).

Chemical composition of milk produced did not differ significantly between all buffaloes fed all tested ration; this was probably because the pattern of the fermentation would remain the same with similar milk content in all tested groups with feeding different ration. However**,** the high quality roughages and CFM with suitable ratio used in tested rations lead to complementary feed. These observations agree with Youssef [1]. Major constituents of buffaloes milk did not influenced by fed rations contained maize stalk and rice straw silages and fresh berseem [17].

The average of milk fat, protein, lactose, SNF and TS yield showed the same trend of milk yield. However**,** the experimental results were mainly reflected of the differences in milk yield of the experimental animals.

Feed conversion and economic efficiency

Data of feed conversions expressed as DM, TDN, CP and DCP required to produce one kg of 7% FCM are presented in **Table (7).** Buffaloes fed tested rations TR1and TR2 had a better fed conversion than those fed CR, over the above items. Except for TDN item, the values of DM, CP and DCP/1kg of 7% FCM were similar between TR1 and TR2 rations and were significantly favorably with TR2 in relation with CR. These results are in accordance with those obtained by EL-Giziry et al., **[16],** who indicated that introducing corn Stover and rice straw silages with fresh berseem led to improve feed conversion of lactating buffaloes. The better feed conversion with feeding FB and MS or THS along with CFM (TR1 and TR2) might be attributed to formulated more balanced rations (energy protein and Ca/p ratios) compared with feeding berseem as a sole feeding (CR).

TABLE 6. Average daily milk and 7% FCM and its composition compared with buffaloes fed tested rations during winter season.

Items	CR	TR1	TR2	SEM
Average milk yield (kg/head/day)	10.89[b]	12.06[ab]	13.02[b]	0.35
Average 7% FCM yield(kg/head/day)	10.38[b]	11.70[ab]	13.13[a]	0.38
Milk composition %				
Fat %	6.55	6.71	7.08	0.11
Protein	4.37	4.34	4.33	0.04
Lactose	5.79	5.82	5.70	0.05
SNF	10.87	10.87	10.73	0.04
TS	17.42	17.58	17.81	0.11
Ash	0.71	0.71	0.70	0.001
Milk constituents yield (kg/head/day)				
Fat	0.71	0.81	0.92	0.03
Protein	0.48[b]	0.52[ab]	0.56[a]	0.02
Lactose	0.63[b]	0.70[ab]	0.74[a]	0.02
SNF	1.18[b]	1.31[ab]	1.40[a]	0.04
TS	1.90[b]	2.12[ab]	2.32[a]	0.002
Ash	0.077[b]	0.085[ab]	0.092[a]	0.002

a and b: Means in the same raw with different superscripts differ significantly ($p<0.05$).

It was indicated that the total cost per head/day for CR, TR1 and TR2 were 45.0, 48.0 and 44.0 LE /head/ day, respectively with significantly different between CR and TR1. While there is no significantly differences in the daily cost of feeding between CR and TR2 due to replacing part of berseem by THS which had low price (Table**,7**).Meantime the feed cost /1kg of 7%FCM was reduced by 5.35 and 22.81% as the result of replacement part of FB by MS and THS (TR1 and TR2, respectively.

While, the 7% of FCM revenue increased by feeding TR1 and TR2 by 8.89 and 26.50 LE, respectively compared with CR. Also, the net revenue increased by 14.87 and 44.31% in TR1 and TR2, respectively. Such results were mainly a reflection of the increase of milk production and improve feed utilization with replacing a part of berseem by MS and THS in TR1 and TR2.These results are harmony with those recording by Youssef [1] who indicated that a replacing a part of FB by corn Stover and rice straw silages in the rations of lactating buffaloes decreased the feed cost per kg of 7%FCM by about 10.7 to and 15.18%and increase milk revenue up to 20.35 and 23.62%, respectively.

These results revealed that replacing part of FB by MS and THS compared with feeding FB as a sole feeding in Egypt during winter season lead to increase the daily of 7.0% FCM yield by 12.72 and 26.49%, reduce the feed cost /1kg 7.0% FCM by 5.53 and 22.81 % and increase the net revenue by 14.87 and 43.81% along with improve feed conversion and economic efficiency.

This study was conducted also, to investigate the effect of generalization of these technical packages (partial replacement FB by MS or THS) on reducing the gap of wheat grain in Egypt or reducing its import. The study focused on estimating the amounts of FB that can be saved, at the local level due to the usage of both kinds of silages which was previously indicated through the present comparative study (30 kg berseem/head /day on the average) (Table5) also the other results concerning the partially replacement of FB by different kinds of silage [15, 16].

TABLE 7. Feed conversion and economic efficiency for buffaloes fed tested rations.

Item	CR	TR1	TR2	SEM
Feed conversion				
DM kg/kg 7% FCM	1.69[a]	1.49[ab]	1.37[b]	0.05
TDN kg/kg 7% FCM	0.99	1.00	0.91	0.03
CP kg/kg 7% FCM	0.195[a]	0.167[b]	0.149[c]	0.01
DCP kg/kg 7% FCM	0.120[a]	0.093[b]	0.081[b]	0.004
Feed cost (LE/day)	45.00[b]	48.0[a]	44.0b	0.36
7%FCM revenue (LE/day)	103.80[b]	117.0[b]	131.30[a]	3.54
Feed cost/7%FCM	4.34[a]	4.10[a]	3.35[b]	0.14
Net revenue*	59.80[b]	68.69[b]	86.30[a]	3.56
Economic efficiency**	2.31[b]	2.44[b]	2.98[a]	0.10

Considering the number of dairy animals in Egypt (4.891 million dairy cows and buffaloes) as shown in Table (8) and based in wi feeding period that containing 8.0 months from November to June (240 day).The amount of berseem that can be saved at the national level is estimated by 28864800 tons produced from 874903 feddan or 53.75% of the present permanent berseem area that reached to about 1633067 fed (with average yield 32.992 ton /fed) as shown in Table (8).

So, using these two technical packages for feeding dairy animals (cows and buffaloes) can save an area of berseem about 874903 fed, which could be produced about 2388485 tons of wheat covering about 18.83% of the total wheat gap (the average yield of wheat 2.73 ton/fed) and the gap of wheat production was 12685000 tons over year 2018 as shown in Table (8).

TABLE 8. Some economic and technical variables related to economics of replacing a part of berseem by both kinds of silages at the national level

Items	Unit	Estimated value
1-Average area yield of permanent berssem [18]	Fed	1633067.0
1- Average yield of green berseem/ faddan 2018 [18]	Ton	32.992
1- Total yield of green berssem 2018 [18]	Ton	53877982.0
2-Price of one ton green berssem [18]	LE	500.0
1- Average area of wheat crop 2018 [18]	Fed	3134947.0
1- Average yield of wheat grains [18]	Ton	2.73
1- Total yield of wheat grains 2018 [18]	Ton	8558807.0
3-Wheat gap {imports) for average 2021 [19]		12685000.0
4- Price of one ton of wheat [20]		5857.0
5- Number of dairy animals (middle and old age) [21]		
Buffaloes of old age	Head	1.225 million
Buffaloes of middle age	Head	0.573 million
Cows of old age	Head	1.498 million
Cows of middle age	Head	0.722 million
Total of dairy buffaloes and cows	Head	4.0091 million

Feddan =0.42 Hectare. The corresponding value of these quantities was 17.07 billion LE (based on the price of one tone wheat was 5857 LE season 2021.

Conclusions

The expected economic inputs of generalization these technical packages and using of these feeding systems for feeding dairy animals in Egypt:

-Cultivated berseem area could be reduce at least by 53.75%, or save about 50% of berseem produced in the national level and can be conserved as a silage or hay for summer feeding.

-Wheat production can be increased by 2.39 million ton and the wheat gap can be decreased by about 18.83%.

- The usage of both kind of high quality silages for lactating animals will be avoid the dietary disorders accompanied with *ad libitum* feeding of berseem.

- Farmers income will be increase as the result of increase milk production and reduce the feed cost of milk produced.

Acknowledgement:

Authors are grateful to the members of Animal Production Department and Agriculture Research Center for their support during the study

Funding statement:

No funding is received for this study

Conflict of Interest:

The authors declare that no conflict of interest

Ethical approve:

All experimental procedures were approved by the ethical committee of Faculty of Agriculture, Kafrelsheikh University, Egypt.

Author`s contributions:

Nabil Mohamed Eweedah: Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Writing original draft. Said Ahmed Mahmoud; Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Writing original draft. Mahmoud Mohamed Bendary; Formal analysis, Methodology, Writing—original draft. Abdelhmeed Abdelhameed Srour; Formal analysis, Investigation, Methodology, Writing—original draft.

References

1. Youssef, I.S.S. Nutritional status of livestock in Egypt in *Symposium* on the role of o scientific research in sowing feedstuffs 19 - 20 September, Cairo, Egypt 1978).

2. Abdel-Rahman, H., Baraghit, G.A. Omar, S.S. and Komonna, O.F. Growth performance, nutritive value, nitrogen balance, some rumen and blood parameters and testicular development of Ossimi lambs fed either berseem, ray grass of their mixture. *Egyptian .J. Nutrition and Feeds,* **4** (Special Issue) *Proc 8th Conf. Animal Nutrition* 23-26 October, Sharm El-Sheikh Egypt (2001).

3. Abdel-Rahman, H., Dinasoury, M.S. and Mohamed, A. M. Growth and reproductive performance of buffaloes heifers fed different green forage levels. *Egypt-Amer-Conf. Physiol*. *Anim. Prod*., PP.315. El- Fayoum Egypt (1993).

4. Topps, J. H. and Oliver. J. Animal foods of Central Africa. *Zimb. Agric. J. Tech. Hand B-,* **2**, 76- 105 (1993).

5. Walaa, M. E., sadek, M.S. E. and . EL- Nahrawy, M.M. Silage yield and quality of some maize and teosinte genotypes and their hybrid. *American. Eurasian J. Agric. Environ Sci*., **1725**, 373-378(2017).

6. Darwish, A., Hassouna, M. E., Rammah, A. H. and Abdel Gawad, M.M.S. Fodder beet roots in restricted rations for lactating cows. Third Egyptian British Conf. Anim. Fish and Poultry Production. Alexandria7-10 Oct (215-220), (1989).

7. Paul, S. S., Asit, B.M. and Pathak, N. N. Feeding standards for Lactating riverine buffaloes in tropical conditions. *J. of Dairy Research,* **69**, 173-180 (2002).

8. .*Analytical Chemistry of foods*. Published by Blockie Academic and professional, an imprint of Chapman and Hall, Western Cleddens Road, Bishopbriggs. Glasgow G642 NZ, UK (1995).

9. *Official Methods of Analysis*. *AOAC.*19th Ed, AOAC. Internal, Gaithersburg, MD, USA (2012).

10- Wardeh, M. F. Models for estimating energy and protein utilization for feeds. Ph. D. Thesis Utah State University. (1981).

11. Raft, N. A. and Saleh, M.S. Two formulas for their conversion of cows and buffaloes milk different fat percentage Proceedings of *The 1st Animal Production Conferences* (APC62), Minia, p. 203.(1962).

12. IBM SPSS Statistics. *Statistical package for the social sciences*, Release 22. SPSS. ince, Chicago, USA. (2014).

13. Duncan, D, B C. *Multiple range and multiple-test, Biometrics,* **11**, 1-42 (1955).

14. Ranjhan, S.k. *Animal nutrition in tropics.* 1sted, viks pub. Hcuse, Pvt, Ltd. Indian, Delhi. (1980).

15. Chatterjee, B. and Maiti, N. *Silage and hay making Indian Council of Agricultural - Research,* New Delhi (1981).

16. El-Aidy, A.A. Effect of maize silage usage with berseem on the production and reproduction performance of dairy buffaloes *Msc. Thesis*, Fac. Agric. Ain Shams University (2003).

17. EL-Giziry, A.A., Abd El-Hady, M.A.A. and Khalil, M.A. Utilization of rice straw for feeding ruminants: 4-Economic and nutritional study of corn stalks and green rice straw silages in partial replacement of berseem in winter feeding of buffaloes. *Egyptian. J. Nutrition and Feeds*, **14** (3), 433 - 444(2011).

18. Agricultural Economic Affair Sector. *Bultein of the Agricultural Statistics. Part 1 winter crops 2014-2015.* (2017)

19. **https//:** lziraeia.com. The price of one ton corn grains (2021).

20. J. of the Youm 7, 8, November. The price of wheat grain (2021).

21. Central Agency for Public Mobilization and Statistics. *Annual Bulletion of Statistics livestock Arab Republic Egypt* (2018).

الاداء الانتاجي للجاموس الحلاب متأثرا بالاستبدال الجزئي للبرسيم بسيلاج الذرة وهجين الريانه خلال فصل الشتاء في مصر

عبدالحميد عبدالحميد محمد سرور[١] و سعيد احمد محمود[٢] ونبيل محمد عويضة [٢*] ومحمود محمد بنداري[٣]

[١] قطاع الانتاج - سخا – مركز البحوث الزراعية - مصر.

[٢] قسم الانتاج الحيواني – كليه الزراعة – جامعة كفرالشيخ – مصر.

[٣] معهد بحوث الانتاج الحيواني – الدقي – مركز البحوث الزراعية – مصر.

تم استخدام ٩ جاموسات حلابة بطريقة العودة الي ذي بدء لدراسة تأثير استبدال جزء من البرسيم بسيلاج الذرة وهجين الريانة علي الاداء الانتاجي للجاموس الحلاب حيث قُسِمَت العلائق الي عليقه المقارنة وهي تمثل (السيطرة أو الضابطة)العليقة الشتوية الشائعة في مصر تتكون من ٩% علف مركز + ٦٦% برسيم + ٢٥% قش ارز. العليقة التجريبية الاولي: تتكون من ١٥% علف مركز + ٣٥% برسيم و ٢٠% قش ارز+ ٣٠% سيلاج اذره .العليقة التجريبية الثانية: تتكون من ١٥% علف مركز + ٣٤% برسيم + ٢٠% قش ارز + ٣١% سيلاج هجين الريانه. أظهرت النتائج بان الحيوانات غذيت علي اعلاف عالية الجودة وكان التركيب الكيماوي المحسوب لكل العلائق المستخدمة متقاربه فيما عدا المادة الجافه والمركبات الخالية من النيتروجين وتراوحت القيمة الغذائية للعلائق الثلاثة من ٥٨,٣٢ الي 67.28 % للمركبات الغذائية المهضومة ومن ٥,٩٢ الي ٧,١٣ للبروتين المهضوم وكانت جوده كلا النوعين من السيلاج عالية وذات صفات تخمر مناسبه وهناك فرق معنوي في انتاج اللبن واللبن المعدل بين عليقه المقارنة والعلائق التجريبية الأخرى بينما لا توجد فروق معنويه بين المعاملة الاولي والثانية كذلك لم يكن هناك فروق معنويه في مكونات اللبن بين المعاملات .سجلت الحيوانات المغذاة علي العليقة المختبرة الاولي والثانية افضل كفاءة غذائية وتحويليه مقارنه بالعليقة الضابطة. كانت تكاليف التغذية اليومية ٤٥,٠ و ٤٨,٥ و ٤٤,٥ جنيه/يوم بينما كان متوسط تكلفه انتاج كجم لبن معدل في اليوم ٤,٣٤ و ٤,١٠ و ٣,٣٥ جنيه للمعاملات الثلاث علي التوالي و قد زاد صافي الايرادات للمعاملة الاولي والثانية مقارنه بالكنترول .التغذية علي سيلاج الذرة وهجين الريانه في العليقة الشتوية ادي الي زياده انتاج اللبن المعدل ٧% دهن بمقدار ١٢,٧٢ و ٢٦,٤٩ علي التوالي والي تحسين الكفاءة الاقتصادية وتوفير ٥٠% من البرسيم علي المستوي القومي والذي يمكن حفظه في صوره سيلاج او دريس للتغذية عليه في فصل الصيف او تخفيض مساحه البرسيم بنسبه ٥٣,٧٥ مما يؤدي الي زياده انتاج القمح

الكلمات الدالة: سيلاج الذرة ، سيلاج هجين الريانه ،البرسيم ،الجاموس ، اللبن.