

# COMPARATIVE FEEDING STUDIES ON THE EFFECT OF THREE VARIETIES OF CLOVER ON THE YIELD, FAT CONTENT AND DENSITY OF EGYPTIAN BUFFALOE'S MILK

By

A.K. ABOU-RAYA, M.A. RAAFAT AND M.F. SULTAN

*Animal Production Dept. (Nutrition), Fac. Agric. Cairo Univ.*

---

## SUMMARY

Six groups of five buffaloes each, were chosen from a herd of 700 at Bahtim Experiment Station for comparative feeding of three varieties, Meskawy, Wafeer and Fahl, during two seasons. The effect on milk yield, fat yield, fat percentage, and milk density was compared during 17 weeks of lactation starting after the peak. Ghoneim's standards were used for maintenance and milk production considering that each kilogram green clover equals 0.1 kg. Starch Value. A significant linear regression was found to exist between the average daily milk yield and weekly intervals (milk yield on time) during the periods of experiment with the six groups. This linear regression indicated the average rate of decrease in milk yield with each group, being between 0.20 and 0.30 pounds in daily milk yield per week. The rate of decrease was the same between the two groups fed on Meskawy and Wafeer in the first season and the two groups fed on Meskawy and Fahl in the next season indicating generally the similarity of the effect of the three varieties on the rate of decrease in daily milk yield per week. The average percentage decrease in milk yield among the groups during the whole experimental period was found to be 26.68, 20.14 and 23.74% in Meskawy, Wafeer and Fahl in the 1st season, being 31.8, 32.5 and 26.5% respectively in the 2nd. At each season there was no significant difference between any two groups. There was also no significant difference between any two groups at each season concerning the average percentage decrease in fat yield during the experimental period. There was also similarity among the groups fed on the different clover varieties concerning the trend of the change in fat percentage and density, the fat% tended to increase and the density to decrease as lactation advanced. Therefore, feeding experiments indicated the similar effect of the three varieties on milk yield, fat yield, fat percentage and density.

## INTRODUCTION

In a previous paper by the authors, a comparative study was undertaken on the yield and nutritive analysis of Meskawy clover, Wafeer and Fahl (13). It was also considered important to undertake comparative feeding experiment with these three varieties using the main animal and type of production in Egypt. Undoubtedly, the ruminants are the main animals for production suiting our rotation producing roughage foods principally clover and straws.

Milk production is the most suitable for our intensive system of agriculture. About 1.4 million tons of milk are produced annually ; the buffaloes have the highest share reaching 70.6% while cows have a share of 22.6% (15). Milk produced is still below the demand of increasing population and the individual daily consumption from milk is still very low not exceeding 0.3 lb. (15). Therefore, every effort was undertaken to solve the nutritional problems concerning buffaloes and milk production. Some investigations related to the replacement effect of clover with other concentrates on the growth of sheep, buffalo calves and milk yield and composition were undertaken (7,8,9).

Badr (1) found that grazing clover by dairy animals as usually used by the farmer is not suitable in practice resulting in overfeeding without any increase in milk yield. Several investigations were also published in relation to feeding dairy animals with berseem and clover (2, 3, 11, 14, 17) indicating that some factors are involved which might have a direct effect on milk yield but have little effect on milk composition.

In this paper, comparative feeding experiments were performed with lactating buffaloes to study the effect of the three varieties of clover, Meskawy, Wafeer and Fahl, on the milk and fat yield as well as the change in fat percentage and milk density. The new synthetic variety Wafeer was to be compared with its parents, Meskawy and Fahl.

#### EXPERIMENTAL AND METHODS

The studies were undertaken at Bahtim Experiment Station in two seasons 1958-59 and 1959-60. The clover used for feeding dairy buffaloes was taken from Meskawy, Wafeer and Fahl varieties which were used at the same time for studying their yield and composition in a previous paper (13). Three feddans were sown (in three different areas every 15 days) from Meskawy or Wafeer in the first, and second season while 6 feddans were sown from Fahl at 6 successive dates every fifteen days in the first season and 5 feddans in the 2nd one. The clover was cut at an age of 60-75 days in the first cut, 45 at the 2nd and 3rd one and 30 days at the 4th with Meskwy and Wafeer. With Fahl cutting was at an age of 60 to 89 days in some cases or 73 to 130 days. The daily cut area from each variety was 15 square Kassabas from Meskawy and Wafeer and fluctuated between 9 and 15 square Kassabas with Fahl so that the produced clover was ca 450 kg. sufficient for feeding a group of 5 buffaloes.

### *Groups of dairy buffaloes*

30 buffaloes were chosen from a herd of 700 at the Station divided into 6 groups of five, 3 groups of them for each season. In the first season, the animals were at the 1st lactation at an age of 3 years while at the 2nd they were 4 years old at the 2nd lactation. Group A, B and C were fed on Meskawy, Wafeer and Fahl respectively in the first lactation, the corresponding Groups being D, E and F for the second lactation.

Each group was chosen with animals having close calving date within a month at maximum and having close milk yield. Calving started at 1st August up to 23rd October 1958 in the first season and continued from 19th of July up to 28th of September 1959 in the 2nd season. The feeding experiments started after the milk peak 12 to 18 weeks after calving. Two weeks feeding were used as a preliminary period, followed by 17 weeks experimental period.

### *Feeding*

Each group was fed individually on the appropriate clover in byers, the calculated amounts of clover which fluctuated between 43 to 77 kg. were offered along with 4 kg. wheat straw to improve the physiological property of the food.

Ghoneim's standard was used for maintenance and production with buffaloes. For maintenance 0.51 kg. starch value and 50 gm. digestible protein per 100 kg. live weight were applied. For milk production the starch value per kilogram milk was calculated from its energy value and the corresponding metabolizable energy assuming that each kilogram starch value produces 3671 Calories metabolizable energy and 2821 Calories net energy in milk. Ghoneim's equation (6) was used for calculating milk energy value from its fat percentage. The starch value per kg. milk ranged between 0.30 to 0.40 kg. according to fat % from 5 to 8% (0.13 to 0.18 kg. starch value per pound milk). Digestible protein in food was at least twice the amount of protein in milk produced. From fat% in milk, protein percentage was calculated using Ghoneim's equation (6).

In the first lactation period with group A, B and C, an extra 10 kg. green clover were given. Each kilogram. clover was considered to equal 0.1 kg. starch value.

The requirements for each buffalo were calculated from its weight daily milk yield and fat percentage obtained at the last day of the 2nd week of the preliminary period; they continued to be constant throughout the experimental period.

*Milking and recording milk yield*

Animals were milked twice at 5 a.m. and 3 p.m., a milk man for each group, taking care for last strippings. Milk was recorded to the nearest half a pound.

*Daily milk samples*

A proportionate daily milk sample of 200 ml was prepared every week from evening milk on Friday and morning milk on Saturday. Evening milk was kept at 6°C to be mixed with morning milk and then kept for further 24 hrs. at 6°C before analysis. Daily samples were 510.

*Fat analysis and density determination*

Classical Gerber method was used to the nearest 0.05%. Before analysis the sample was heated up to 40°C in a water bath, then cooled to a temperature between 15 and 20°C.

Density was determined with a lactometer graduated at 15°C; lactometer reading was corrected at 15°C using Fleischmans' tables(5).

*Statistical analysis*

Snedecor's book (16) and that of Eid (4) were consulted.

*Some considerations for interpreting the results*

The fat percentage determined in a daily sample in the week was considered to represent the fat percentage during the whole week. For producing the average daily fat yield in the first 4 weeks and last 4, the average fat percentage in the four weeks as well as the average daily milk yield were obtained.

The relation of the average daily milk yield for each group of five buffaloes, with the order of the advancing weeks of lactation was studied using the linear regression. Although physiologically the natural decrease in milk yield after the peak follows an equation of descending exponential type (12), but from a practical point of view during relatively a short period of lactation, the natural decrease appeared to follow a simple linear curve. This was in fact assumed by Kellner (10) and Ghoneim *et al* (8) using the "swing over" method in feeding experiments with dairy animals. Such assumption was to be tested in this study to facilitate the methods of comparison in such feeding experiments.

As there were differences in milk yield of individual animals in each group, the percentage decrease in milk yield or fat yield for each individual was calculated during the experimental period. The average percentage decrease was then obtained for each group and was statistically compared with that of other groups in each season.

**RESULTS AND DISSCUSSION**

*Relation between the milk yield and order of weeks in lactation*

The results in Talbe I indicated that with each group the average milk yield tended to decrease as weeks of lactation proceeded. The drop during the 17 weeks of experimental period was ca. 3 to 5 lbs of milk.

**TABL 1.—Comparison of the average daily milk yield of different Groups of buffaloes fed on different varieties of clover during two seasons.**

ORDER of the week	First season			Second season		
	Group A* Meskaway	Group B Wafeer	Group C Fahl	Group D Meskaway	Group E Wafeer	Group F Fahl
	lb.	lb.	lb.	lb.	lb.	lb.
1	17.0	16.4	12.7	15.6	16.5	15.6
2	17.0	16.0	13.0	14.7	16.4	15.1
3	17.9	17.4	13.0	14.4	15.7	14.7
4	17.4	17.6	13.4	13.0	14.4	14.6
5	17.0	17.4	12.6	12.6	14.4	14.4
6	16.0	17.0	12.0	13.4	14.4	14.1
7	16.0	16.8	12.9	13.6	14.4	13.7
8	15.6	16.4	12.0	13.0	14.0	14.0
9	15.4	16.4	11.9	13.4	14.4	14.0
10	15.7	16.4	11.0	13.4	13.9	13.7
11	15.4	16.7	10.9	11.6	12.9	13.0
12	15.4	16.1	10.9	11.9	12.4	12.6
13	14.4	15.4	10.9	11.6	12.1	12.4
14	14.0	15.0	11.1	11.9	12.0	12.1
15	13.4	14.7	10.9	11.6	11.1	11.1
16	13.0	13.6	10.1	11.1	10.9	11.1
17	12.4	12.9	9.8	10.7	11.1	11.4

\* Each group = 5 buffaloes

A significant linear regression was found to exist between the milk yield “Y” and the order of the week in lactation “T” in all the six groups of buffaloes as follows :

Group	Regression equation	Calculated “t”
A	$Y = 18.17 - 0.30T$	12.00
B	$Y = 18.52 - 0.28T$	8.00
C	$Y = 13.51 - 0.20T$	10.00
D	$Y = 14.95 - 0.24T$	10.80
E	$Y = 16.71 - 0.35T$	15.90
F	$Y = 15.69 - 0.26T$	15.29

Therefore, the relation between milk yield and intervals in lactation is linear from a practical point of view during 120 days of lactation after the peak. This is a suitable feature for the "swing over" method. This could be applied to determine more correctly the natural decrease in milk yield and to predict the milk yield from a simple equation.

The linear regression would qualify statistically the rate of decrease in milk yield and the range of this rate enabling comparison of different groups which have the same milk yield at the start.

*Comparison between the rate of milk decrease among the groups fed on different varieties of clover*

In the first season, it was found that Group A and B had an average daily milk yield at the 1st week of  $17.0 \pm 2.51$  and  $16.4 \pm 1.12$  lb. respectively; the difference between both groups was not significant (calculated  $t = 0.218$ ). The weekly rate of decrease in daily milk yield was  $0.30 \pm 0.025$  in Group A fed on Meskawy and  $0.28 \pm 0.040$  lb. in Group B fed on Wafeer. The rates of decrease in both groups were practically alike indicating that both Meskawy and Wafeer had the same effect on milk yield with lactating buffaloes.

In the second season the yield of Group D fed on Meskawy was  $15.6 \pm 1.2$  lb in the first week being statistically the same as that of Group F ( $15.6 \pm 0.24$  lb). The corresponding rate of decrease in daily milk yield per week during the experimental period was  $0.24 \pm 0.026$  and  $0.26 \pm 0.017$  lb. being practically the same and indicating the same effect of Meskawy and Fahl on the change in milk yield.

Therefore, it was possible to conclude from the results of the two seasons that the three varieties Meskawy, Wafeer and Fahl have the same effect on the rate of decrease in milk yield as lactation proceeded during 17 weeks after the milk peak.

*Comparison of the effect of the variety of clover on the percentage decrease in milk yield during the whole experimental period*

From the results in Table II, it was found that the average percentage decrease in milk yield during the whole period was  $26.68 \pm 5.26$ ,  $20.14 \pm 5.20$  and  $23.74 \pm 4.40$  with Group A, B and C fed on Meskawy, Wafeer and Fahl respectively. The difference in percentage decrease between any two groups was found to be insignificant (calculated "t" not exceeding 0.87).

With the 2nd season the average percentage decrease was  $31.80 \pm 6.56$ ,  $32.50 \pm 4.63$  and  $26.52 \pm 2.62$  in groups D, E and F respectively. The difference was also insignificant between any two groups ("t" not exceeding 1.08). Therefore, the results in both seasons indicated that the three varieties of clover have the same effect on the percentage decrease in milk yield during the whole experimental period.

TABLE 2.—Comparison of the average percentage decrease in daily milk during the experimented period with different groups of buffaloes fed on different varieties of clover

First season				Second season			
Group* and Animal No.	Daily Yield 1st week	Daily Yield 17th week	Difference	Group* and Animal No.	Daily Yield 1st week	Daily Yield 17th week	Difference
	lb.	lb.	%		lb.	lb.	%
<i>Gr. A :</i>				<i>Gr. D :</i>			
1	19.00	13.42	29.30	16	13.57	11.71	13.60
2	15.86	11.71	26.10	17	17.86	12.71	28.80
3	13.29	7.57	43.00	18	15.42	10.00	35.00
4	11.29	10.14	10.00	19	18.57	13.42	27.00
5	25.71	19.29	25.00	20	12.42	5.71	54.00
Average	17.03	12.43	26.68	Average .	15.57	10.71	31.80
			±5.26				±6.56
<i>Gr. B :</i>				<i>Gr. E :</i>			
6	13.29	11.14	16.10	21	17.86	12.14	32.00
7	14.71	14.00	4.80	22	17.71	9.14	48.30
8	16.29	13.29	18.00	23	13.43	8.71	35.00
9	18.42	13.86	24.80	24	16.43	13.00	20.80
10	19.29	12.14	37.00	25	17.29	12.71	26.40
Average	16.40	12.89	20.14	Average .	16.54	11.14	32.50
			±5.20				±4.63
<i>Gr. C :</i>				<i>Gr. F :</i>			
11	16.86	13.57	19.40	26	16.43	11.43	30.40
12	13.14	10.29	21.70	27	15.00	11.71	21.80
13	11.43	9.14	20.00	28	17.86	11.71	34.40
14	10.00	5.86	41.40	29	15.29	12.14	20.50
15	12.29	10.29	16.20	30	13.43	10.00	20.50
Average	12.74	9.83	23.74	Average .	15.60	11.40	26.52
			±4.40				±2.62

\* Gr. A and D=Meskawy, B and E=Wafeer, C and F=Fahl.

It was also found that among the individual buffaloes of the group, the percentage decrease in milk yield differed widely indicating that the greater the number of buffaloes in the group, the more reliance would be on the results.

*Comparison of the effect of the variety of clover on the percentage decrease in fat yield during the whole experimental period*

Results in Table III indicated that the average percentage decrease in daily fat yield during the experimental period was  $17.62 \pm 5.72$ ,  $15.06 \pm 4.31$  and  $11.73 \pm 3.95$  in Group A, B and C respectively in the first season. The corresponding averages with Group D, E and F of the 2nd season were  $18.97 \pm 5.48$ ,  $27.99 \pm 6.41$  and  $11.76 \pm 4.69$ .

Statistically, the difference between any two groups in either seasons was found to be insignificant. In the 1st season "t" was not exceeding 0.84 and in the 2nd season was not exceeding 2.04 in one case (between E fed on Wafeer and F fed on Fahl in the 2nd season). It was also found that great variation existed among individual buffaloes in the group.

TABLE 3.—Comparison of the average percentage decrease in daily fat yield during the experimental period with different groups of buffaloes fed on different varieties of clover

First season				Second season			
Group* and Animal No.	Daily Yield 1st 4 weeks	Daily Yield last 4 weeks	Difference	Group* and Animal No.	Daily Yield 1st 4 weeks	Daily Yield last 4 weeks	Difference
	lb.	lb.	%		lb.	lb.	%
<i>Gr. A :</i>				<i>G. Dr :</i>			
1	1.37	1.21	11.67	16	0.99	0.96	3.03
2	1.27	1.00	21.25	17	1.15	1.02	11.30
3	0.98	0.63	35.91	18	1.23	1.00	18.69
4	0.86	0.76	1.16	19	1.86	1.27	31.72
5	1.80	1.47	18.33	20	0.73	1.51	30.13
Average . .	1.26	1.01	17.62 ±5.72	Average	1.09	0.95	18.97 ±5.48
<i>Gr. B :</i>				<i>Gr. E :</i>			
6	0.94	0.77	18.08	21	1.65	1.09	33.94
7	1.03	0.98	4.75	22	1.59	0.82	48.42
8	1.11	0.93	16.21	23	0.94	0.79	15.95
9	1.36	1.25	8.08	24	1.64	1.17	28.67
10	1.49	1.07	28.18	25	1.23	1.07	13.00
Average . .			15.06 ±4.31	Average . .			27.99 ±6.41
<i>Gr. C :</i>				<i>Gr. F :</i>			
11	1.05	1.01	3.80	26	1.31	0.99	24.42
12	0.94	0.83	11.70	27	0.96	0.95	1.04
13	1.03	0.91	11.65	28	1.25	1.08	13.60
14	0.80	0.59	26.25	29	0.92	0.91	1.08
15	0.92	0.86	5.49	30	1.23	1.00	18.69
Average . .			11.73 ±3.95	Average . .			11.76 ±4.69

\* Gr. A and D = Meskawy, B and E = Wafeer, C and F = Fahl.

This may indicate that the three varieties of clover have the same effect on the percentage decrease in fat yield during the experimental period. But Fahl might have a less decreasing effect on fat yield particularly in the 2nd season. Although the difference between Gr. E and F was insignificant but the probability P was weak being between 0.05 and 0.01. This point needs further investigation to assure the superiority of Fahl clover.



*Comparison of the effect of the variety of clover on the fatpercentage and milk density throughout the experimental period*

Results in Table IV indicated generally that fat percentage with all groups tended to increase. The fat percentage at the start was 7.4, 7.2 and 7.6 with group A, B and C being 8.2, 8.0 and 8.0% at the 19<sup>th</sup> week respectively. The maximum fat percentage reached was 8.7, 8.4 and 8.3 respectively. This showed that the similarity in the average fat percentage in the groups fed on Miskawy, Wafeer and Fahl, throughout the experimental period in magnitude and trend of change. In the 2<sup>nd</sup> season, the results were the same but the average fat percentage in Group E fed on Wafeer was higher at the start. At the first week, fat percentage was 7.5, 8.5 and 7.3 in group D, E and F respectively; the corresponding maximum fat percentage was 9.5, 9.7 and 9.4.

The change in density (lactometer reading at 15°C) was generally similar in the three groups during the experimental period of the two seasons. It seems that density tended to decrease as lactation proceeded in the 2<sup>nd</sup> season. This was in accordance with the general change in milk, the density decreases as fat percentage increases with the advancement of lactation. But in the first season density changed in a similar way in the three groups without a special trend. The range of average lactometer reading for the groups during the experimental period was 33.8-37.7, 34.2-37.9, 33.6-36.9 in the first season with Group A, B and C respectively. The corresponding values in the 2<sup>nd</sup> season were 31.4-35.5, 31.7-33.8 and 31.1-38.3 in Group D, E and F.

From these results with fat percentage and density among the groups, it could be concluded that the effect of feeding lactating buffaloes on different varieties of clover, Miskawy, Wafeer and Fahl was practically the same.

From these comparative feeding experiments, it was realised that the three varieties of clover have the same effect on the yield of buffaloes milk fat, yield fat percentage and density. As the variety Wafeer produced higher yield of green and dry clover than Miskawy when sown under the same conditions, it seems that this new variety is promising in feeding practice. Further work is needed for comparative study with Miskawy and Wafeer under different districts in Egypt to ensure the superiority of Wafeer under different climatic and soil conditions.

TABLE 4.—Comparison of the change in average fat percentage and density (lactometer reading) in milk during the experimental period with different groups of buffaloes fed on different varieties of clover

Week order	First season						Second season					
	Group A*		Group B		Group C		Group D		Group E		Group F	
	Fat %	Density	Fat %	Density	Fat %	Density	Fat %	Density	Fat %	Density	Fat %	Density
1	7.4	35.0	7.2	35.5	7.6	34.0	7.5	33.0	8.5	32.5	7.3	33.8
2	7.4	34.9	7.2	34.6	8.1	34.5	6.8	33.6	8.1	32.5	7.9	35.2
3	7.9	35.5	7.6	34.3	8.1	34.2	7.3	33.2	7.2	33.0	7.8	34.3
4	8.6	33.8	8.0	35.3	8.8	34.9	8.7	33.8	7.7	33.8	8.8	33.7
5	8.3	34.0	8.0	34.4	8.6	33.9	8.2	34.1	8.4	33.6	8.6	33.6
6	8.0	34.8	7.5	34.2	8.2	33.6	8.0	35.5	8.6	33.8	8.9	35.4
7	8.0	37.4	7.7	37.5	8.1	36.2	8.4	33.3	8.8	31.7	9.0	34.3
8	8.7	36.2	8.2	37.4	8.4	36.7	7.4	31.4	8.6	32.0	8.1	32.5
9	8.8	35.2	8.3	35.6	6.9	35.8	7.9	32.0	8.9	31.9	8.5	33.6
10	8.7	35.9	8.4	35.5	7.2	35.9	9.3	33.2	9.0	32.4	9.1	33.6
11	8.2	37.7	8.4	35.5	8.7	35.2	9.7	32.4	9.0	32.4	9.3	38.3
12	8.0	35.4	6.9	35.5	8.1	35.3	9.5	31.9	9.0	32.4	9.4	33.8
13	8.4	35.6	7.7	35.3	8.4	35.1	8.9	32.1	9.0	32.5	8.2	32.7
14	8.4	34.4	7.9	35.6	8.5	35.5	8.6	33.0	9.2	32.2	8.7	33.6
15	8.6	34.8	7.9	34.6	8.6	34.2	8.9	32.4	9.7	32.4	8.7	31.6
16	8.6	34.9	8.1	34.5	9.3	35.2	9.2	31.9	9.2	33.0	8.8	32.1
17	8.2	36.5	8.0	37.9	8.8	36.9	9.1	32.3	8.9	33.3	8.7	31.1

\* Group A & D = Meskawy; B & E = Wafeer, C & F = Fahf.

## ACKNOWLEDGEMENT

The authors are thankful to Dr. Aly Hassan Fahmy, Professor of Dairy, Faculty of Agric., Caro. university, for his interest in the investigation and useful critics during the experimental work. Thanks are also due to Mr. Ahmed Afifi, Director General of the Egyptian Agricultural Organisation for his kind facilities at Bahtim Experiment Station and to Dr. Mohamed El Seify, Director of the Plant Breeding Section at Bahtim Station for provision of facilities and seeds of Wafeer clover. He participated greatly for production of this synthetic variety.

## REFERENCES

1. **Badr, M. F.** (1959).—Effect of feeding berseem alone or along with concentrates on milk production. *Agriculture research, Faculty of Agric., Alexandria University*. Vol. 7, No. 2 : 282 (in Arabic).
2. **Berke, P.** (1953).—Experiments in feeding milk cows with green fodder. *All attenjesztes*, 2 (4) 289. (*Dairy Sci. Abstracts* 16 (10), 799, 1954).
3. **Das Gupta, N C. and Indian, T.** (1943).—Green berseem as a substitute for concentrates for economic feeding of dairy cattle. *Vet. Sci.*, 15 (3), 196 (*Dairy Sci. Abstracts* 6 (4), 153, 1945)
4. **Eid, M.T.** (1953).—Experimental Agricultural Statistics. 1st Ed. *Maktabet El Nahda Elmasria*, (In Arabic).
5. **Fleischman, W. and Weighann, H.**, (1932).—Lehrbouch der Milchwirtschaft siebente auflage verlag. von Paul Parey, Berlin S. W. 11.
6. **Ghoneim, A.** (1946).—Relation between fat and (A) Protein, (B) Heat Value in Buffalo's Milk. *Nature*, 158 : 342.
7. **Ghoneim, A., Raafat, M.A., Abou-Raya, A.K. and Abou-Hussein, E.R.M.**, (1957).—Economic food mixture for the growth of Egyptian calves. 1. Effect of replacing part of clover or its hay by undecorticated cotton seed cake, for feeding buffalo calves during the 2nd year of growth. *Cairo Univ. Fac. Agric. Bull. No. 150*.
8. **Ghoneim, A., Raafat, M.A., Abou-Raya, A.K. and Abou-Hussein, E.R.M.**—Economic feeding of dairy cows and buffaloes for milk production in Egypt I—A study on the effect of replacing the concentrates by different levels of clover on the yield and qualities of milk and fat produced by Egyptian cattle. *Cairo Univ. Faculty of Agric. Bull.* (in press).
9. **Ghoneim, A., Raafat, M.A., Abou-Raya, A.K. and Samman, S.**, (1957).—Mutton production from Egyptian Sheep. III—Effect of increasing undecorticated cotton seed cake in the ration on sheep growth particularly when combined with clover (berseem) or its hay during the winter and summer feeding. *Cairo Univ. Fac. Agric. Bull. No. 114*.
10. **Kellner, O.**, (1926).—The Scientific feeding of Animals. 2nd Ed. *Authorised Translation by W. Goodwin, Duckworth, London W.C.*
11. **Mathur, M.L.**, (1954).—Studies on the effect of different fodders on the milk yield and its composition and mineral metabolism in Sahiwal cows. *Dairy Sci. Abs.*, 16, (8), 622.

12. **Maynard, L.A. and Loosli, J.K.**, (1956).—Animal Nutrition. *4th Ed.*, McGraw Hill Book Company Inc, New York.
13. **Raafat, M.A., Abou-Raya, A.K. and Sultan, F.**, (1963).—Comparative study on the yield and nutritive analysis of three varieties of Egyptian clover (*Trifolium alexandrinum*) at different cuts. (*under publication*).
14. **Ratt, A.D. and Holdoway, C.W.**, (1943).—The feeding value of clover molasses silage for milking cows. *Virginia Sta. Bull.* **353** : 15.
16. **Salem, H. M.**, (1960).—Meat Poultry and dairy Production. *Alfelaha*, Vol. **4** pp. 385 (in Arabic).
16. **Snedecor, G. W.**, (1957).—Statistical Methods. *5th Ed.*, Iowa State College press.
17. **Thomé, K.E.**, (1949).—A case of great depression of the fat content of the milk at the beginning of the grazing period. *Dairy Sci. Abstracts*, **1,3**, 132.

(Printed in 1966)

## دراسة مقارنة لتأثير تغذية ثلاثة أنواع من البرسيم للجاموس الحلوب على محصول اللبن والدهن وكثافة اللبن

أحمد كمال أبو رية - محمد علي رأفت - محمد فاروق سلطان

### الملخص

اختيرت لهذه الدراسة ٣ جاموسة من بين ٧٠٠ من محطة الطلائق بمزرعة بهتيم قسمت الى ٦ مجاميع للمقارنة بين تأثير التغذية على البرسيم المسقاوى والوفير والفحل في ثلاث مجاميع لكل موسم من موسمي الدراسة ، وذلك على محصول اللبن والدهن وتغير النسبة المئوية للدهن والكثافة في اللبن ، لمدة ١٧ أسبوعاً تبدأ بعد وصول الادرار أقصى مداه . وغذيت كل جاموسة على مستويات غنيم للعليقة الحافظة والانتاجية باعتبار كل كجم برسيم أخضر يعادل ا.ر. كجم نشا مهضوم . ووجد في حالة المجاميع الستة وأن هناك تأثير مؤكّد تمثيله الحليب الاسبوعية على متوسط الادرار اليومي أثناء فترة التجربة يمكن تمثيله بمعادلة الخط المستقيم لتبين سرعة تناقص ادرار اللبن اليومي كل أسبوع وتراوح هذا التناقص بين ٢٠.ر. - ٣٠.ر. رطلاً في الادرار اليومي كل أسبوع ، وأمكن استخدام هذه المعادلات للمقارنة بين تغير الادرار في مجاميع الحيوانات التي كان ادرارها واحداً عند ابتداء التجربة ووجد أن معدل التناقص في الادرار كان متشابهاً في الموسم الاول بين مجموعتي الجاموس التي تتغذى على البرسيم المسقاوى والوفير وفي الموسم الثاني بين مجموعتي الجاموس التي تتغذى على البرسيم المسقاوى والفحل . وهذا يبين بصفة عامة التشابه في تأثير التغذية على أصناف البرسيم الثلاثة من حيث سلوك ادرار اللبن في فترة التغذية . ووجد أن النسبة المئوية لتناقص الادرار طوال فترة التجربة كانت ٢٦ر٦٨ ، ٢٠ر١٤ ، ٢٣ر٧٤ ٪ في حالة البرسيم المسقاوى والوفير والفحل في الموسم الأول ، وكانت ٣١ر٨٠ ، ٣٢ر٥٠ ، ٢٦ر٥٠ ٪ على الترتيب في الموسم الثاني دون أن توجد فروق معنوية بين أي مجموعتين في كل موسم . وفي حالة النسبة المئوية لتناقص محصول الدهن طول فترة التجربة لم يوجد كذلك أي فرق معنوي بين أي مجموعتين في كل موسم . ووجد تشابه عام بين سير التغير في نسبة الدهن المئوية أثناء فترة التجربة في المجاميع الثلاث لكل موسم فكانت نسبة الدهن تميل للارتفاع بتقدم الموسم وتميل الكثافة للانخفاض .

ومن هذه الدراسة يتضح تشابه تأثير تغذية الأصناف الثلاثة على سير الادرار ومحصول اللبن والدهن ونسبة الدهن المئوية والكثافة .