J. Agric. Sci. Mansoura Univ., 27 (4): 2063 - 2072, 2002

EFFECT OF DIFFERENT LEVELS OF POTASSIUM FERTILIZATION ON GROWTH, YIELD QUALITY AND DIGESTIBILITY OF FODDER BEET BASED DIETS by SHEEP

Barakat, A.H. *; M. Marghany**; N. S. Meawed *and G.M.A. Sarhan*
* Forage Crops Res. Sec. Field Crops Res. Inst. Agric. Res. Center, Giza Egypt.
** Animal Production Research Institute, Agriculture Research Center, Ministry of Agriculture, Egypt.

ABSTRACT

The present investigation was carried out at Agriculture Research Station and Animal Production Research Institute Gemmieza, Gharbia Governorate during 1998/1999 and 1999/2000 seasons to study the response of fodder beet (*Beta vulgaris*) to potassium fertilizer rates (0, 25, 50 and 75 $kgKO_2$/fed) and its utilization in feeding sheep. The obtained data revealed that growth characters of fodder beet plants (root length), dry forage yields and forage quality (crude protein, curde fiber, and ash yields/fed) increased with increasing of potassium fertilizer up to 50 kg/fed. While, root diameter and fresh forage yields increased at the rate of 25 kgK_2O/fed.

As a results of potassium fertilizer up to 50 kg/fed dry matter intake (DMI) and digestible crude protein (DCP) and chemical composition of crude protein (CP), ether extract (EE) and ash% were higher when compared with those of other treatments. Total dry matter intake by sheep was significantly higher at 75 kg K_2O/fed compared with other treatments level. Fresh beet roots treated with highest level of K fertilizer are more palatability by sheep. Increasing the level of K fertilizer up to 25 Kg/fed improved DM, OM, CP and CF digestibility. Nutritive value and feed units intake [(TDN) and (SE)] increased at the rate of 25 kg K_2O/fed.

Keywords: fertilization, potassium, fodder beet, digestibility, sheep.

INTRODUCTION

During summer season, animal need green forage in which the green fodder is scarce. Fodder beet, as a new winter forage crop in Egypt, comes mature at the end of berseem season. Then it could be kept during summer season to fill some of the gap in green forage for livestock feeding. The root yield as well as the above ground parts are used either for feeding animal directly or for making silage. Fodder beet area is increasing in the last few years in Egypt.

Fodder beet recommended as a good source of energy (roots) and protein (leaves) for animal feeding (Knabe et al., 1986 and Schwarz et al., 1992). In addition, it was found to be suitable for wide range of soil (Rammah et al., 1984 and Zaki, 1995). The fodder beet is harvested within a very limited of time, therefor it is essential to find out the suitable way to conserve it to narrow to gab of feeding during summer and early autumn where the storage in feedstuffs is usually at its peak.

Potassium is considered to be an essential element which is responsible for many functions of enzymes needed for the vital processes and growth. Balba (1968) stated that K is essential for translocation of carbohydrates in plants. Tirue and Pascaru (1975) reported that fodder beet root yields were increased by increasing K-fertilizer application. Turkina (1975) found that application of 120 kg/ha each of N. P_2O_5 and K_2O increased root yield by 16.37%. Chochola (1978) reported that K increased root weight of sugar beet by favouring transport of metabolites to the storage organ. Bucher et al. (1982) and Orlovius (1984) found that K fertilizer increased root weight of fodder beet by improving transport of metabolites to the storage organs. Ali et al. (1984) found that K fertilization has a vital role in fodder beet production, and the application of 75 kg K_2O/fed at planting is quite enough for best production. Taha et al. (1994) demonstrated that the average amount of potassium removed by the crop was nearly twice that of nitrogen and eight times that of phosphorous.

The objectives of this study was to investigate the effect of different levels of potassium fertilization on the productivity and quality of fodder beat and to determine the feed intake and nutrients digestibility, using fodder beet roots in sheep diets.

MATERIALS AND METHODS

The present investigation was carried out at Agriculture Research Station and Animal production Research Institute Gemmieza, Gharbia Governorate during 1998/1999 and 1999/2000 seasons to study the response of fodder beet (*Beta vulgaris*) to four potassium fertilizer rates (0, 25, 50 and 75 kgK_2O/fed) and its utilization in feeding sheep. A randomized complete block design with four replications was used. The plot area was 12.37 m^2 (3.30 $\times$ 3.75 m) included 9 rows for the distances 35 cm between rows. Calcium super phosphate (15.5% P_2O_5) was applied at the rate of 150 kg/fed during seedbed preparation. Nitrogen fertilizer as a urea (46% N) at the rate of 200 kg/fed and potassium sulphate (48% K_2O) at the rate of 0, 25, 50 and 75 Kg/fed were splited into two equal portions. The first portion was applied after thinning (30 days after sowing in the two seasons). After 60 days from thinning, the other portion of nitrogen and potassium fertilization were applied. Fodder beet seeds (*voroshenger cv.*) were sown at a rate of 3 kg/fed on November 20,27 in the first and the second seasons, respectively in hills 25 cm a part. The plants were thinned to one plant per hill 30 days after sowing. Other cultural practices were carried out at usual for fodder beet. Fodder beet was harvested, on June 24 and 15 in the 1^{st} and 2^{nd} seasons, respectively. At harvest, the following characters were recorded:

I Growth and forage yield

1- Root length (cm)
2- Root diameter (cm)
3- Fresh forage yield included laves and roots (ton/fed)
4- Dry forage yield included laves and roots (ton/fed)

II Forage quality

The following characters were estimated on the roots:

1- CP % and yield /fed
2- CF % and yield /fed
3- Ash% and yield/fed

In order to study the some parameters of the nutritive values, digestion coefficient and feed intake, four digestibility trials were carried out using twelve adult Oseamy rams which were divided into 4 groups each of 3 rams with an average body weight of 64.5 kg to evaluate the experimental rations which consists of concentrate feed mixture (CFM) at the rate 1.5% of their live body weight (LBW) and fodder beet root *ad-libitum* under for levels of K fertilizer (0, 25, 50 and 75 kg K_2O/fed). The digestibility trial lasted 21 days, the first 14 days were used as preliminary period along with 7 days collection period. The rams were put individually in metabolic cage during the experiments in quantities 10% more than what needed for maintenance. The rams were fed twice daily at 8 a.m and 4 p.m. Water was offered after fedding in free amount. Chemical composition of feedstuffs and feces were carried out according to A.O.A.C. (1980). In this concern the characters were studied.
The obtained data were statistically analyzed according to Senedecor and Cochran (1967) and means were tested for differences using Duncan's Multiple Range Test (Duncan; 1955).

RESULTS AND DISCUSSION

I- Effect of potassium fertilizer rate on:
A- Growth parameters and forage yield

Data presented in Table (1) show that in both seasons, varying the rate of potassium fertilizer significantly affected all growth and yield characters studied. Root length tended to increase as K fertilizer rate increased up to 50 kg K_2O/fed while, root diameter responded significantly and positively with increasing K fertilizer rate up to 25 kg K_2O/fed. In addition, increasing potassium fertilizer increased fresh forage yield up to 25 kgN/fed and dry forage yield up to 50 kgN/fed in both seasons. The results indicate that potassium application at the rate of 25 kg K_2O/fed resulted in a significant increase in fresh forage yield by 23.69% and 28.08% over the control treatment in the first and second seasons, respectively. Also, results indicate that potassium fertilization at the rate of 50 kg K_2O/fed resulted in an increase in the dry forage yield by 38.65% and 37.30% over the control treatment in the first and second seasons, respectively. This increase in the forage yield may be due to the increase in root length and diameter. Such increase in fresh yield could be due mainly to favourable effect of K element on the vegetative growth of plants through enhancing the photosynthesis process and consequently the accumulation of dry matter in roots.

The role of potassium as a macronutrient element in plant nutrition can not be ignored. Though its role in protein, carbohydrates

Table (1): Growth and forage yield of fodder beet as affected by potassium fertilizer levels during 1998/99 and 1999/2000 seasons.

Potassium fertilizer	Root length (cm)		Root diameter (cm)		Fresh forage yield ton/fed		Dry forage yield ton/fed	
KgK_2O/fed	98/99	99/2000	98/99	99/2000	98/99	99/2000	98/99	99/2000
0	22.05c	28.38c	10.00b	10.43c	47.20c	49.93c	6.83b	6.30c
25	24.55b	32.50b	11.60a	15.48a	58.38a	63.95a	9.35a	7.25bc
50	27.85a	37.56a	11.58a	12.38b	58.10a	58.95b	9.47a	8.65a
75	23.40b	31.25b	10.05b	11.68b	52.65b	57.51b	9.08a	7.75ab
Mean	24.46	32.42	10.81	12.49	54.08	57.51	8.68	7.49

a,b,c Means with different superscripts at the same column are significantly ($P < 0.05$) different.

Table (2): Quality characters (cp, cf and ash percentages and there yields of fodder beet (roots) as affected by potassium fertilizer levels during 1998/99 and 1999/2000 seasons.

Traits	Crude protein yield		Crude fiber yield		Ash yield	
KgK_2O/fed	%	Kg/fed	%	Kg/fed	%	Kg/fed
1998/1999						
0	10.0	683 b	12.52	876.29 b	8.28	565.52 b
25	11.03	1031.31 a	11.49	1074.32 a	9.02	843.37 a
50	13.10	1240.57 a	11.72	1109.88 a	10.49	993.40 a
75	11.50	1044.20 a	11.63	1056.00 a	9.57	868.96 a
1999/2000						
0	10.50	661.5 b	12.26	772.38 b	9.09	572.67 b
25	11.06	801.85 a	12.74	933.65 a	9.05	656.13 a
50	12.91	1116.72 a	11.21	969.67 a	9.80	847.7 a
75	11.60	875.75 a	11.78	912.95 a	9.91	768.03 a

a,b,c Means with different superscripts at the same column are significantly ($P < 0.05$) different.

synthesis as well as translocation of charbohydrates is well known. Supporting results were obtained by Tyamin (1981) and Marie (1984) who reported that potassium application increased the yields of tops and roots of fodder beet. Abdel-Aal (1990) found that increasing potassium fertilizer up to 72 kg K_2O/fed increased significantly root diameter, total weight/plant and total yield/fed (top + roots). Moreover, Basha (1998) found that adding potassium fertilizer at rate of 48 Kg K_2O/fed to fodder beet increased, root diameter and fresh and dry forage yield/fed up to 75 kg K_2O/fed.

B- Forage quality:

The analysis of variance showed that potassium fertilizer treatments had a significant effect on crude protein, crude fiber and ash yields/fed as shown in Table (2) The obtained data indicated that crude protein, crude fiber and ash yields increased with increasing potassium application from 0 kg/fed to 50 kg K_2O/fed. The increases percentage for the plants fertilized with 25, 50 and 75 kg K/fed over the control reached 50.99, 81.64 and 52.88% in the first season and 21.22, 68.82 and 32.39% in the second season for crude protein, 22.59, 26.66 and 20.51% in the first season and 20.88, 25.54 and 18.20% in the second season for crude fiber, and 49.13, 75.66 and 53.66% in the first season and 14.57, 48.03 and 34.11% in the second season for ash yield, respectively.

It could be suggested that the increase in crude protein, crude fiber and ash yields may be due to the increase in dry forage yield and an increase in their percentages. These results are similar to those found by El-Khawaga and Zeiton (1993) who found that application of potassium fertilizer up to 80 kg K_2O/fed significantly affected, crude protein percentage and ash percentage. Also, El-Seifi (1997) revealed that potassium fertilizer, especially at 15 kg K_2O/fed increased thicknes, fresh weight and dry weight of snap bean pods. His results indicated also that potassium is necessary to improve the pods quality.

2- Nutritional evaluation and utilization of fodder beet roots

A- Chemical composition:

Chemical composition of feedstuffs and experimental rations are presented in Table (4). Highest values of crude protein (CP), ether extract (EE) and ash% were obtained when plants supplied with 50 kg K_2O/fed. Most nutrient of fodder beet root were at same trend obtained by Mehany (1991) and Zaki (1995).

B- Forage yield:

As a result of potassium fertilization, yields of fresh forage, dry mater (DM), total digestible nutrients (TDN) and digestible crude protein (DCP) were significantly ($P < 0.05$) higher when compared with corresponding values of control treatment Table (3). The highest values ($P < 0.05$) of fresh forage, (DM), (TDN) and (DCP) were obtained by 25 kg K_2O and 50 kg K_2O/fed fertilizers.

Table (3): Fresh and dry matter fodder beet yield (ton/fed) as affected by potassium fertilizer levels

Item	Potassium fertilizer levels kg/fed			
	0.0	25	50	75
Fresh (ton/fed)	47.20c ± 0.70	58.38a ± 0.63	58.10a ± 0.94	52.65b ± 0.53
DM (ton/fed)	6.83b ± 0.10	9.35a ± 0.10	9.47a ± 0.15	9.08a ± 0.09
TDN (ton/fed)	5.00c ± 0.08	6.88a ± 0.07	6.73a ± 0.11	6.35b ± 0.07
DCP (gm./fed)	0.69d ± 0.01	0.97b ± 0.01	1.07a ± 0.02	0.92c ± 0.01

a,b,c Means with different superscripts at the same row are significantly ($P < 0.05$) different.

Table (4): Chemical composition of concentrate feed mixture, fodder beet with different levels of potassium fertilizer and experimental rotions (on DM basis).

Items	DM	Nutrients in DM %					
		OM	CP	CF	EE	NFE	Ash
Concentrate feed mixture (CFM)	90.46	90.50	16.50	12.46	3.85	57.69	9.50
Fodder beet root							
0.0 kg K_2O/fed	14.47	91.72	10.00	12.52	1.24	67.96	8.28
25 kg K_2O/fed	16.01	90.98	11.03	11.49	2.12	66.34	9.02
50 kg K_2O/fed	16.29	89.51	13.10	11.72	2.73	61.96	10.49
75 kg K_2O/fed	17.24	91.43	11.50	11.63	2.25	65.05	9.57
Calculated chemical composition of experimental rations		On DM basis					
0.0 kg K_2O/fed	30.83	89.80	14.10	12.48	2.89	61.48	9.05
25 kg K_2O/fed	32.14	90.70	14.38	12.09	3.18	61.04	9.31
50 kg K_2O/fed	33.52	90.13	15.63	11.92	3.43	59.29	9.73
75 kg K_2O/fed	33.77	90.87	14.53	12.13	3.13	60.45	9.76

The ingredients of feed mixture were 34% undecortecated cotton seed cake, 35% wheat bran, 16% yellow corn, 10% rice bran, 3% molasses 1% limestone and 1% salt.

C- Digestion coefficients:

Total dry matter (DM) intake by sheep as (g/head/day), (g/kg $W^{0.75}$) and (kg/100 kg BW) were shown in Table (5) the total DM intake as g per kg$W^{0.75}$ or kg per 100 kg body weight (BW) was significantly ($P < 0.05$) higher at 75 kg K_2O/fed than those of others treatments. These results indicated that roots of fodder beet treated with the highest level of potassium fertilizer are more palatability by sheep. Moreover, the daily DM intake from the experimental rations were higher than maintenance allowances (2% BW) for sheep which is recommended by NRC (1975) due to the high palatability of fodder beet roots and to cover their nutritional requirements.

The digestion coefficient of all nutrients were not differ significantly between four levels of potassium fertilization. It could be observed that the DM, OM, CP, and CF digestibility of group supplied with 25 kg K_2O/fed were slightly higher than other groups. Increasing the level of K fertilizer up to 50 kg/fed improved CP and EE digestibility. Similar results were obtained by Shalaby (1989) and Zaki (1995). But decrease DM and OM digestibility may be to increasing DMI. While, increasing CP digestibility due to increasing content DCP gm/fed.

Table (5): Feed intake and digestion coefficients of fodder beet rations fed by rams

Items	Potassium			
	0.0	25	50	75
DM intake (g/h/d):				
FM	897	935	953	980
FB	519	592	559	586
Total DM intake (g/h/d)	1416 ± 145.91	1527 ± 31.14	1512 ± 154.37	1566 ± 32.79
Total DM intake ($g/kgW^{0.75}$)	64.10 b ± 2.09	67.47 b ± 0.18	65.58 b ± 1.48	70.26 a ± 0.48
Total DM intake (kg/100 kg B.W.)	2.23 d ± 0.05	2.39 b ± 0.01	2.31 c ± 0.02	2.47 a ± 0.01
Digestion coefficients %				
Dry matter (DM)	74.23 ± 4.15	74.56 ± 1.24	73.15 ± 2.34	71.80 ± 1.73
Organic matter (OM)	75.40 ± 4.43	77.27 ± 1.11	74.70 ± 2.21	73.67 ± 1.44
Crude protein (CP)	71.35 ± 3.46	72.27 ± 1.13	72.16 ± 1.25	69.05 ± 2.19
Crude fiber (CF)	48.24 ± 4.07	49.89 ± 2.11	46.18 ± 3.02	42.69 ± 2.87
Ether extract (EE)	85.72 ± 2.40	86.77 ± 0.29	86.92 ± 0.81	85.59 ± 0.87
Nitrogen free extract (NFE)	83.95 ± 1.34	83.37 ± 1.40	80.44 ± 2.47	80.23 ± 1.15

a,b,c Means with different superscripts at the same column are significantly ($P < 0.05$) different.

D- Nutritive value and feed units intake:

Nutritive value and daily feed units intake of sheep fed the experimental rations contain four levels of potassium fertilizer are presented in Table (6). On DM basis, the total digestible nutrients (TDN) and SE tested ration increased at the rate of 25 kg K_2O/fed, but DCP increased by increasing the level of potassium fertilizer up to 50 kg K_2O/fed and due to increasing digestion coefficient and increasing CP content in ration. This could be associated with the highest CP digestibility value as a result of the increase of nitrogen in fodder beet root. El-Khawaga and Zeiton (1993) found that crude protein content in roots was significantly increased with increasing potassium up to 80 kg K_2O/fed.

Table (6): Nutritive value and feed units intake of fodder beet rations fed by rams

Items	Potassium fertilizer levels kg/fed			
	0.0	25	50	75
Nutritive value (DM basis)				
TDN %	73.28 ± 2.57	73.52 ± 1.02	71.14 ± 1.92	69.91 ± 1.30
SE %	66.65 ± 2.52	66.94 ± 1.04	64.60 ± 1.80	63.37 ± 1.31
DCP %	10.07 ± 0.54	10.39 ± 0.16	11.27 ± 0.05	10.10 ± 0.33
Feed units intake:				
TDNg/h/d	1037.64± 140.03	1122.65 ± 37.57	1075.64±133.20	1094.79 ± 6.72
$TDNg/kgW^{0.75}$	46.04 ± 2.55	49.61 ± 0.82	46.81 ± 2.25	47.64 ± 0.86
SEg/h/d	943.76 ± 129.70	1022.17 ± 35.89	976.75 ± 121.78	992.37 ± 6.20
SE $g/kgW^{0.75}$	41.87 ± 2.42	45.17 ± 0.82	42.50± 2.08	43.18 ± 0.76
DCPg/h/d	142.59 ± 21.67	158.66 ± 4.40	170.40 ± 16.20	158.17 ± 3.52
$DCPg/KgW^{0.75}$	6.33 ± 0.46	7.01 ± 0.12	7.42 ± 0.13	6.88 ± 0.19

Basha (1998) reported that adding K fertilizer at rate of 48 kg K_2O/fed increased protein content. The feed units intake by sheep as TDN, SE and DCP per g/h/d or $kgW^{0.75}$ were not significantly different among all experimental rations, but the improved DCP intake was obtained by increasing potassium fertilizer that may be due to improve DCP nutrient and CP digestibility. These results are in agreement with those obtained by Zaki (1995).

In conclusion, the results of the present study showed that potassium fertilizer levels up to 50 kg K_2O/fed could successfully improved CP content for ruminant rations, and can be replace nearly one third of concentrate feed mixture in ration.

Further study needed to investigate the effect of feeding fodder beet root fertilizer with 25 kg K_2O or 50 kg K_2O/fed levels on milk production and growth performance.

REFERENCES

Abdel-Aal, S.M. (1990). Effect of nitrogen, phosphorus and potassium fertilization on the productivity of fodder beet (*Beta vulgaris* L.) Egypt. J. Agron. 15: 159-170.

Ali, F.M.; M.A. Nasr and M.A. Harfosh (1984). Effect of rate and time of application of nitrogen and potassium fertilizers on four fodder beet cultivars (*Beta vulgaris* L.) J. Agric. Res., Tanta Univ. 10(3) 871-880.

A.O.A.C. (1980). Association of Official Agricultural Chemical Official Methods of Analysis. 13th Ed. Washington, D.C.

Balba, A.M. (1968). "Soil Fertility" Dar El-Matboat El-Gadida, Alex., Egypt. (In Arabic).

Basha, H.A. (1998). Response of fodder beet to time and rate of potassium fertilizer application in newly cultivated sandy soil. Zagazig J. Agric. Res. 25(1) 31-44.

Bucher, R.; T. Diez and B. Bihler (1982). Results of two long-term potasium fertilizer experiments in the loess region of northern Bavaria. Part I: The influence of increasing rates of K on plant yield, quality and K uptake. Landwirtschaftliche forschung, sonderheft 38: 162-177 (C.F. soil and fert- 1983, 46 (10): 10443).

Chochola, J. (1978). The problem of control of nitrogen nutrition in sugar beet. Agrochemia 18: 234-236 (C.F. information services, INC. Print 22/5/1-186. Page: 468, Item 120 of 186).

Duncan, D.B. (1955). Multiple Range and Multiple F-tests. Biometrics, 11: 1-42.

El-Khawaga, A.A.H. and O.A.A. Zeiton (1993). Yield and chemical composition of fodder beet as affected by nitrogen and potassium fertilization under newly reclaimed area. Egypt. J. Appl. Sci., 8(2) 54-62.

El-Seifi, S.K. (1997). Effect of some pre-and post- harvest treatments on yield and storageability of snap bean pods under Ismailia region conditions. Zagazig J. Agric. Res. 24(3) 537-551.

Kanbe, O.; M. Fecher and G. Weise (1986). Verfahren der silageproduction. VEB Deutscher Landwirtschaflsverlag Berlin. 247.

Marie, Z.M.A. (1984). Study in intercropping production of fodder beet on common crops. M.Sc. Thesis, Fac. of Agric., Mansoura Univ.

NRC (National Research Council) (1975). Nutrient Requirement of Sheep. 5th Ed. National Academy of Sciences, Washington, D.C.

Orlovius, K. (1984). Results of a seven year trials with NK fertilizer treatmetn on a loess site in Franconia with intensive crop rotation. Landwirtschaftliche Forschung (40): 343-353. (C.F. soils and Fert. 48(4): 3950).

Rammah, A.M.; F.M. Ali and M.T. Hassan (1984). Evaluation of fodder beet cultivars for different locations and years. EMCIP pub 7: 215-224.

Schwarz, S.G.; E.Pex; and M. Kirchgessner (1992). Nutritive value of mixed fodder beet silage for dairy cows. Nutr. Abstr. And Rev. 62: 357.

Shalaby, A.S.; G.M. Abdul-Aziz; A.M. Rammah; and M.G. Beshay (1989). Fodder beet, a new forage in Egypt. 2.

Snedecor, G.W. and W.G. Cochran (1967). "Statistical Methods" 6th Ed. Lowa State Univ. Press, Ames, Iowa, U.S.A.

Taha, S.A.; E.A. Awadallah; M.E. El-Kerbawy and S.A. El-Kishky (1994). Studies of fertilizer requirements of sugar beet. Egypt. J. Appl. Sci., 9(7) 677-690.

Tirue, I. and E. Pascaru (1975). Effect of fertilizer on yield and quality of irrigated fodder beet on the Brailer terrace. Analele Institutuluide cercetari pentru cereale S. plant Technice, Fundulea, B. (1970), Publ (1972) 38, 399-405. Institutuf de cercetari pentru cereale Romania. (C.F. Herb. Abst. 45,2).

Turkina, V.A. (1975). Effect of mineral fertilizers on yield of root crop. Turdy, Permskii sel skokozyanst vennyi In stitat (1972) 98, 23-28 (Ru) Sel, skokonzinstitut, Perm, USSR. from perferativnyi shurnal (1974) 7-55-713. (C.F. Herb. Abst. 45,8).

Tyamin, V.V. (1981). Effect of fertilizers on the contents of major and trace elements in fodder beet. Agrokhimiya No. 2: 66-71 (C.F. Herb. Abst., 53, 3518, 1983).

Zaki, A.A. (1995). Natritional studies on the utilization of some green forages in ruminant and rabbit feeding. Ph.D. Thesis, Fac. Agric. Zag. Univ. Egypt.

تأثير إضافة معدلات مختلفة من السماد البوتاسى على النمو والمحصول ومعاملات الهضم للعلائق المحتوية على بنجر العلف مع الأغنام

عبد الحميد حسين بركات*، مصطفى مرغنى**، نبيل ساويرس معوض*، جمال محمد على سرحان*

* قسم بحوث محاصيل العلف- معهد المحاصيل الحقلية – مركز البحوث الزراعية
** معهد بحوث الإنتاج الحيوانى – مركز البحوث الزراعية – وزارة الزراعة

أجريت تجربتان حقليتان خلال موسمى الزراعة ٩٨/٩٩، ٩٩/٢٠٠٠ بمحطة البحوث الزراعية ومحطة البحوث والتجارب التابعة لقسم الإنتاج الحيوانى بالجميزة. محافظة الغربية لدراسة تأثير إضافة معدلات مختلفة من السماد البوتاسى على النمو والمحصول ومعاملات الهضم للعلائق المحتوية على بنجر العلف باستخدام ١٢ من كباش الأغنام مقسمة إلى ٤ مجاميع بكل مجموعة ٣ كباش تامة النمو وكان يعطى لكل كبش ١,٥% من وزنة الحى عليقة مركزة بالإضافة إلى تقديم درنات بنجر العلف للشبع.

ويمكن تلخيص أهم النتائج فيما يلى:

١- زادت صفات النمو الخضرى لبنجر العلف (طول الجذر)، محصول العلف الجاف وجودة العلف (محصول البروتين الخام والألياف الخام والرماد) زيادة معنوية بزيادة معدل السماد البوتاس إلى ٥٠ كجم بو٢أ/فدان. بينما زاد قطر الجذر ومحصول العلف الأخضر زيادة معنوية عند معدل تسميد ٢٥كجم بو٢أ /للفدان

٢- كان محتوى المادة الجافة (DM) والبروتين الخام المهضوم (DCP) وقيم Ash, EE, CP للتركيب الكيماوى أعلى فى مستوى التسميد البوتاسى ٥٠كجم بو٢أ/فدان بينما زادت مجموع المركبات الذغائية المهضومة TDN والمحصول الخضرى عند معدل ٢٥ كجم بو٢أ/فدان.

٣- أظهرت النتاج أن المعاملة بمعدل ٧٥ كجم بو٢أ/فدان زادت من المادة الجافة المأكولة.

٤- كانت درنات بنجر العلف المعامل بأعلا تركيز بوتاسى أكثر استساغة للأغنام بالنسبة للمأكول.

٥- حسنت زيادة معدل التسميد البوتاسى إلى ٥٠كجم/ فدان كل من البروتين الخام المهضوم والمستخلص الإيثيرى المهضومة .

٦- زادت قيم الوحدات الغذائية المأكولة من TDN المركبات المهضومة الكلية، SE مكافىء النشا عند معدل ٢٥ كجم بو٢أ/فدان.

وتوصى الدراسة أن النتائج السابقة تمكن من استخدام التسميد البوتاسى حتى ٥٠ كجم للفدان والذى يحسن من محتوى البروتين الخام فى علائق المجترات. ويمكن إحلال بنجر العلف محل ١/٣ العليقة المركزة فى علائق المجترات