

EFFECT OF INTERSEEDING BARLEY WITH BERSEEM ON ITS YIELD, CHEMICAL COMPOSITION AND NUTRITIVE VALUE

By

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SUMMARY

Interseeding barley with berseem had no effect on the green yield either in the first cut or in two other successive cuts. There was no pronounced influence upon chemical composition, digestibility nor nutritive value of the forage, the only effect being a slight increase in crude fibre in the first cut. The starch values were 5.49, 6.53 and 7.24 Kg in the first, second and third cuts of the berseem. The corresponding figures of the interseeded berseem were 5.02, 6.22 and 7.02 kg. The yields of the different nutrients per feddan in the first cut and the total yield of the three cuts were not affected by interseeding barley with berseem except in the case of digested crude fibre in the first cut. This latter nutrient was 16.93% higher in the interseeded berseem. The mineral contents of berseem and the interseeded one were nearly the same in the different successive cuts.

Introduction

In Europe and other countries grass-legume mixtures are usually used to secure optimum yield and quality of forage crops. For a long time some farmers in Egypt have tried interseeding barley with berseem as a means to prevent or reduce the danger of bloat.

Ghoneim, (1955) stated that a suitable grass sown along with clover would improve the proportions of protein and fibre in berseem as well as the physical and physiological feeding property of the pasture. Davies and Davies, (1956) found that the yield of lucerne sown alone was at least as great if not greater than that of any lucerne mixtures. Abou Raya and Shahab El Din, (1962) concluded that interseeding barley with berseem had no effect on the yield of green or dry

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herbage in the first, second nor third cuts. Differences in dry matter yield between berseem alone and the mixture in three cuts did not exceed 5.6%. The presence of barley mixed with berseem in the first cut herbage did not affect the moisture content of the mixture; neither were there any significant differences in the percentages of ash, crude protein, crude fat and N.F.E. in the green plant material. The presence of barley mixed with berseem appeared to raise the percentage of fibre in the mixture but this increase was insignificant.

Material and Methods

The present work was conducted on twelve feddans divided into two sectors at the Experimental Farm, Faculty of Agriculture, Giza. One sector was planted to berseem only, and the second to a mixture of berseem and barley. Berseem was sown at the rate of 21 kg per feddan, while the interseeded berseem involved 19 kg of berseem and 4 kg of barley, consistent with common practices by Egyptian farmers.

Six digestibility trials were conducted to determine the nutritive value of the berseem alone and the interseeded berseem in three successive cuts. Although barley plants disappeared from the second and third cuts, it was decided to study the effect of interseeding during the whole growth period of berseem. Cutting in both sectors was performed when the plants attained an average height of 60-70 cm. Animals, weighing, feeding, sampling, recording results and methods of analysis followed the same method as in a previous paper by Ghoneim et al (1963).

Results and Discussion

1.—*The green yield :*

The average yields of the berseem and the mixture (berseem and barley) per feddan were 3,050 and 3,005 kg, respectively, in the first cut. The total yield of forage per feddan in the three successive cuts was 11,698 kg with berseem alone, and 12,380 kg when interseeded with barley. Interseeding with barley resulted in 98.5% as much yield as berseem alone in the first cut and 105.8% as much when all three cuts were considered.

It can be concluded that interseeding barley with berseem had no marked effect upon the yield of the green fodder. These results are in agreement with those of Davies, (1956) and of Abou-Raya and Shehab El Din, (1962).

2.—*The chemical composition, digestibility and nutritive value:*

Table (1) shows that interseeding barley with berseem had no pronounced effect on the chemical composition when compared with berseem alone. The data generally show that interseeding barley with berseem did not affect the chemical composition of the mixture with the first cut in the presence of barley or during the two successive cuts when the herbage was devoid of barley. The only observed effect was a slight increase in the crude fibre content in the first cut (7.38%). These results are in close agreement with those of Davies (1956) and Abou-Raya and Shehab El Din (1962).

The digestion coefficient of crude fibre at the first cut showed an increase of 8.63 per cent units when berseem was interseeded with barley. Generally, it can be concluded that the digestion coefficients of the different nutrients were not affected by either interseeding barley with berseem or the order of cutting.

The starch values of berseem were 5.49, 6.53 and 7.24 kg in the three cuts, respectively. The corresponding starch values of the mixture were 5.02, 6.22 and 7.02 kg. It can be seen that in the first cut, there was a slight increase in the starch value of berseem sown alone over that of the mixture. In the other two successive cuts the starch values were nearly the same in both treatments, tending to be on the lower side with the interseeded berseem.

3.—*The yield of the nutrients :*

In the first cut the quantity of each nutrient, either crude or digested, was lower in the interseeded berseem than in berseem alone, with the exception of digested crude fibre which was higher in the interseeded case (16.03%). There were no effects upon total yields of the nutrients from the three cuts associated with interseeding barley with berseem.

4.—*Mineral content :*

The mineral contents (P, Ca and Mg) at the three successive cuts of the two treatments are presented in Table (2).

TABLE 1.—Chemical Composition, Digestibility and Nutritive Value of Berseem and the Mixture

The cuts	Dry matter %	Analysis of dry matter					Digestion coefficients					Starch Value %
		Crude Protein %	Ether Extract %	Crude Fibre %	N.F.E. %	Ash. %	Dry matter %	Crude Protein %	Ether Extract %	Crude Fibre %	N.F.E. %	
<i>The berseem</i>												
1st. cut . .	10.20	20.31	5.42	18.84	37.82	17.61	62.70	72.15	54.42	44.50	82.93	5.49
2nd. cut . .	12.65	15.92	4.23	24.85	39.92	15.08	63.49	69.04	54.35	50.96	78.78	6.53
3rd. cut . .	15.44	15.07	4.38	29.17	36.51	14.87	59.79	65.97	61.40	47.81	74.65	7.24
<i>The mixture</i>												
1st. cut . .	9.35	20.82	4.42	20.27	37.38	17.15	62.57	71.58	53.23	53.18	80.51	5.02
2nd. cut . .	12.35	16.87	5.07	24.28	38.07	15.71	61.07	65.76	59.58	46.34	78.27	6.22
3rd. cut . .	15.40	13.71	4.02	28.66	38.88	14.73	60.12	65.11	52.16	47.77	73.82	7.02

TABLE 2.—P, Ca and Mg Contents of the Berseem and the Mixture

THE CUTS	The berseem			The mixture		
	P	Ca	Mg	P	Ca	Mg
	(Mg/100g dry matter)					
1st. cut	371	1688	406	376	1591	307
2nd. cut	298	2169	395	301	1776	404
3rd. cut	288	1861	360	273	1653	128

The phosphorus content followed the same trend of crude protein which decreased with the successive cuts. The phosphorus contents of berseem were 298, 288 and 268 mg/100g D.M. in the three cuts, respectively. The corresponding P contents of the mixture were 376, 301 and 273 mg/100g D.M.

The yield of phosphorus in the berseem per feddan was 1.154 kg in the first cut and its total yield in the three cuts was 4.706 kg. The corresponding P yield of the interseeded berseem was 1.057 and 4.771 kg.

Calcium and magnesium contents of the berseem and the mixture fluctuated without any special trend in the different cuts.

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المخلص

تحميل الشعير على البرسيم

سبب تحميل الشعير على البرسيم نقص محصول الفدان من المخلوط عن البرسيم فقط بمقدار ١,٤٨٪ في الحشة الأولى ولكن بتتبع دراسة المحصول في الحشتين التاليتين وجد أن محصول فدان البرسيم المحمل في مجموع الحشات الثلاث أكبر من البرسيم وحده بمقدار ٥,٨٣٪.

ولم يحقق تحميل الشعير على البرسيم اختلافات واضحة في التركيب الكيماوى ومعاملات الهضم والمواد المهضومة والقيمة الغذائية في كل من البرسيم المحمل والبرسيم وحده سواء في الحشة الأولى أو الحشات المتتالية.

ولقد كانت الألياف الخام هي المركب الوحيد التي ازدادت نسبتها في البرسيم المحمل عن البرسيم بحوالى ١,٣٩٪ وذلك في الحشة الأولى كما وجد أن معامل هضم الألياف في المخلوط أعلى من البرسيم حيث كانت قيمتها ٥٣,١٨٪ و ٤٤,٥٥٪ على التوالي.

ولم يتأثر محصول المركبات الغذائية المختلفة ومعادل النشا بتحميل الشعير على البرسيم ولكن الألياف الخام المهضومة هي المركب الوحيد الذى ازداد في الحشة الأولى من البرسيم المحمل عن البرسيم غير المحمل بمقدار ١٦,٩٣٪ أما بالنسبة لاحتويات المادة المعدنية من الفوسفور والكالسيوم والمغنسيوم فقد كانت متساوية تقريبا في كل من البرسيم المحمل وغير المحمل على السواء.