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Effect of number of utilizations in a barley grass in Mediterranean conditions on biomass production and the admissible stocking rate of Majorcan Black Pig

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Abstract. Forages have significant economic value as a food resource for the Majorcan black pig and their environmental and social value is widely recognized. The multifunctionality of livestock production is due to its economic, ecological and social importance and is fully linked to its sustainability. The Majorcan black pig production has been directly linked to the exploitation of agricultural production. The better use of forages has a clear economic impact on the Majorcan black pig production and hence its sustainability. We have studied the biomass production and assessed the Majorcan black pig stocking rate of a barley grass, depending on the number of uses. We used an experimental plot with 4 treatments and three replicates per treatment. Under the agronomic conditions of our study, increasing to three the number of uses, allow more biomass, more protein, more energy, more servings and therefore more stocking rate of Majorcan black pig than two or one use.

Keywords. Majorcan black pig – Sustainability – Number of uses of forages.

Effet du nombre d'utilisations d'un pâturage d'orge en conditions méditerranéennes sur la production de biomasse et la charge de porc noir Majorquin admissible.

Résumé. Les fourrages ont une importante valeur économique en tant que ressource alimentaire pour le porc noir de Majorque et ils sont largement reconnus pour leurs valeurs environnementales et sociales. La multifonctionnalité de l'élevage est due à son importance économique, environnementale et sociale et est complètement en rapport avec sa durabilité. La production de porc noir de Majorque a été directement liée à l'exploitation de la production agricole. Une meilleure utilisation des fourrages a un net impact financier sur la production de porc noir de Majorque et donc sur sa viabilité. Nous avons étudié la production de biomasse et évalué la charge théorique de porcs noirs de Majorque qu'un pâturage d'orge est capable de supporter, en fonction du nombre d'utilisations. Nous avons utilisé une parcelle expérimentale avec 4 traitements et trois répétitions par traitement. Avec les conditions agronomiques de l'étude, le traitement avec trois utilisations produit plus de biomasse, plus de protéines, plus d'énergie, plus de rations et donc permet une plus forte charge de porc noir de Majorque qu'avec deux ou une seule utilisation.

Mots-clés. Porc noir de Majorque – Durabilité – Nombre d'utilisations d'un pâturage.

I – Introduction

In the Balearic islands forage crops occupy a total of 45749 ha of which 20460 are for feed grains, generally produced under rainfed conditions. The most important and extensive livestock census is the sheep, with over 287000 breeding females (Cifre *et al.*, 2007). In second place is the pig sector, in general intensive and with high production inputs, with the exception of the Majorcan black pig production carried out under extensive conditions. The Majorcan Black Pig production system has been directly linked to the exploitation of agricultural production, is linked

to grazing (Jaume *et al.*, 2006) and traditionally has been well (Bosch, 1902). Today, forages have significant economic value as a food resource for the Majorcan black pig. The multifunctionality of livestock production is due to its economic, ecological and social importance and is fully linked to its sustainability (Atance *et al.*, 2000). The management of sustainable production systems should be based on the rational use of existing resources on the farm (Roca *et al.*, 2008). The use and study of forages to adjust the intensity of pasture is important both to avoid damage to the ecosystem and to profit the resources of grass.

II – Materials and methods

The experimental plot with a crop of barley, destined to be exploited by tooth by livestock, was in a homogeneous area, with a system of continuous blocks with three replications for each treatment. There have been four treatments: one of three cuts in February, April and May (FAM), two of two different cuts in the first court date: February-May (FM) and April-May (AM), and the fourth treatment with a single cut in May. Table 1 shows the abbreviations used to denote treatments.

Table 1. abbreviations used to denote treatments

Treatment	February	April	May
FAM	Cut	Cut	Cut
FM	Cut		Cut
AM		Cut	Cut
M			Cut

At each cutting the following data were recorded: fresh and dry production; on a sample of forage the crude protein content (Kjeldhal method) acid-detergent fiber, neutral-detergent fiber and crude fiber (Van Soest method) were analysed and net energy were estimated. From the data of each cut the cumulative production per hectare of biomass, crude protein and metabolizable energy were calculated. To calculate energy and protein needs the tables proposed by FEDNA (2006) for pigs were used. We used student T-test statistical package Stratgraphics to test the hypothesis that improvement occurs between treatments for a 0.05 significance level.

III – Results

Under the conditions of the present experiment, the effect of the number of cuts has showed significant differences ($p < 0.05$) in biomass production, protein and metabolic energy. Thus the treatment with more biomass production and metabolizable energy was that of three cuts (FAM), followed by two cuts (FM, AM) that showed no significant differences between them, and finally single cut treatment (M). The treatment with higher protein production has been three cuts (FAM), followed by two cuts (FM), the two cuts (AM) and finally the single cut (M). The data are presented in Table 2.

It should be noted that the nutritional value of grass, indicated by the relationship crude protein / biomass was increased by increasing the number of cuts. It is not necessary to give the advantage offered by the temporary availability increase in the number of uses.

From a theoretical point of view stocking rate results due to metabolizable energy and crude protein produced by each treatment are presented in Table 3. Grazing three times leads to greater biomass production and consequently, twice as much fattening pigs and sows can graze the same plot as if it is cut once.

Table 2. Accumulated production of biomass, protein and metabolic energy per treatment

Treatment	Biomass (kg/ha)	Protein (kg/ha)	EM (Mcal/ha)
FAM	3.274±750 ^a	528±13 ^a	8.047±465 ^a
FM	2.739±242 ^b	405±34 ^b	6.747±551 ^b
AM	2.894±225 ^b	331±33 ^c	6.714±576 ^b
M	1.863±158 ^c	113±12 ^d	3.546±331 ^c

Table 3. Acceptable stocking rate of Majorcan Black Pig in terms of metabolizable energy and crude protein produced by each treatment

Treatment	Metabolizable Energy		Crude protein	
	Fattening pigs/ha	Sows/ha	Fattening pigs/ha	Sows/ha
FAM	4.1	3.5	5.2	4.8
FM	3.5	3.0	4.0	3.7
AM	3.4	2.9	3.2	3.0
M	1.8	1.6	1.1	1.0

IV – Conclusions

The sustainability of the extensive production of extensive Majorcan black pig is an economic issue. In this regard, using the same inputs, an increase in the number of cuts has obtained higher yields with greater nutritional quality and with a less seasonal annual distribution.

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