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in

Acar Z. (ed.), López-Francos A. (ed.), Porqueddu C. (ed.).
New approaches for grassland research in a context of climate and socio-economic changes

Zaragoza : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 102

2012
pages 493-495

Article available on line / Article disponible en ligne à l'adresse :

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http://om.ciheam.org/article.php?IDPDF=7004

To cite this article / Pour citer cet article

Tedjari N., Madani T., Abbas K. **The quantity and quality of different forage resources (fallow land, grassland and stubble) in the semi arid area of Sétif.** In : Acar Z. (ed.), López-Francos A. (ed.), Porqueddu C. (ed.). *New approaches for grassland research in a context of climate and socio-economic changes.* Zaragoza : CIHEAM, 2012. p. 493-495 (Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 102)

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The quantity and quality of different forage resources (fallow land, grassland and stubble) in the semi arid area of Sétif

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Abstract. This work aims at the knowledge of the pastoral resources productivity and quality used in the Sétifan High Plains. During one year (2003), monitoring the production and the nutritional value of natural pastures, fallow and stubble was conducted in seven farms. This study allowed us to move to the farm plot, specifying the feeding system characteristics; the floristic composition and the resources energetic value studied so far (fallow land, pastures and stubble). The results showed significant differences and varied according to the different seasons. For the grassland, the productivity is 11t/ha. It is of 3 to 4t/ha for stubble and mown fallow; while the production of grazed fallow is of 2t/ha.

Keywords. Productivity – Nutritional value – Forage resources – Semi arid area.

Production quantitative et qualitative des différentes ressources fourragères (jachères, prairies et chaumes) dans la région semi-aride de Sétif

Résumé. *Ce travail vise la connaissance de la productivité et de la qualité des ressources pastorales utilisées dans les hautes plaines Sétifiennes. Le suivi durant une année (2003) de la production et de la valeur nutritive des prairies naturelles, des jachères et des chaumes a été réalisé dans sept exploitations. Cette étude nous a permis de passer du niveau exploitation au niveau parcelle en précisant les caractéristiques du système d'alimentation, en déterminant le niveau de productivité, la composition floristique et la valeur énergétique des ressources étudiées (jachères, prairies et chaumes). Les résultats obtenus ont présenté des différences significatives et ont été variables selon les différentes saisons d'une compagne. La productivité est de 11 t/ha pour les prairies, de 3 à 4 t/ha pour les chaumes et pour les jachères fauchées, alors que la production des jachères pâturées est de 2 t/ha.*

Mots-clés. *Productivité – Valeur nutritive – Ressources fourragères – Région semi aride.*

I – Introduction

By the nature of its climate, its terrain and its vegetation, by the habits and agricultural practices, Algeria is a country with pastoral and forage (Abdelguerfi and Laouar, 2003). However, forage production is limited compared to the needs of existing livestock. So the low interest shown by governments in the development of pastoral resources has led to inefficiencies in land management and environmental degradation, resources are increasingly uncertain. An analysis of the forage balance reported by SI Ziani (2001) helped to highlight the persistence of a fodder deficit estimated at 4 million forage units (UF)/year. Forage production provides local coverage of the needs of livestock by 52%, but the contribution of stubble and straw (3 million of UF) can increase the coverage rate to 82%. This situation arises because the sole forage is limited to low value and relatively low food resources. Our study is the evaluation of the nutritional value of key resources available for livestock grazing (productivity, species composition, and energy) in the Sétif High Plains at key moments of the operating cycles of farming systems and vegetation.

II – Materials and methods

Sétif region is characterized by a Mediterranean climate, the level of rainfall increases from south to north and is between 300 and 600 mm. Thus the study was conducted on seven representative farms in a north-south axis corresponding to the gradient of aridity, having all of them fallow (mowed or grazed), natural grasslands and stubble of barley or wheat. Monitoring was conducted over a year, the series of surveys carried out on major food resources was determined using the operating period of each resource, the sampling method used is the square sets (Bellon and Guérin, 1992). The species collected were divided into three groups: grasses, legumes and other categories of plants, identified following the nomenclature of new flora and Santa Quézel Algeria (1962-1963). The nutritional value of forage harvested from different resources is determined by chemical analysis to evaluate dry matter (DM), the total nitrogenous matter (TNM), mineral matter (MM), crude fiber (CF) the organic matter digestibility (OMD) and the energy in unit of forage (UF).

III – Results and discussion

The results of the forage productivity of different resources studied are estimated by the dry matter yields (Table 1). Significant variations are induced by factors of resource type and level of aridity, which fall into two relatively homogeneous groups; grasslands produce the highest yields with an average of 11.01 t DM/ha. Regarding the level of aridity, significantly higher yields are obtained in the north of the region where rainfall is high and the management style is different. Indeed, the enclosure for hay in early winter, fertilizing, weeding and irrigation can permanently yield higher returns compared to farms in the South, with a difference of 4.9 t/ha. The lower yields in the South can be explained by lower levels of rain and the late enclosure (early spring) practice. In fact, the mixed farming of these resources (pasture/hay), although they enjoy a fertilization and irrigation comparable to the North limit forage productivity. Stubble of barley or wheat and mowed fallow, recorded similar yields of about 3 t/ha. Grazed fallow, characterized by the early beginning of use, before the spring plowing, recorded the lowest dry matter yield.

Table 1. Production and nutritional value of different resources considered

Type of resource	Production (t DM/ha)	Chemical composition (%DM)			Digestibility (%)	Energy value (UF/kg DM)
		MM	TNM	CF		
Grasslands						
Semi-arid higher	13.59	9.45	12.19	20.33	53.5	0.34
Semi-arid lower	8.69	8.7	7.71	26.60	51.98	0.33
Grazed fallow	1.74 ± 1.12^{b}	15.86 ± 5.45^{a}	10.68 ± 2.18^{a}	23.28 ± 8.04^{a}	60 ± 4.87^{a}	0.45 ± 0.09^{a}
Barley stubble	3.32 ± 0.57^{b}	5.89 ± 1.54^{cb}	4.59 ± 0.56^{B}	37.52 ± 4.68^{a}	41 ± 2.99^{c}	0.25 ± 0.25^{c}
Wheat stubble	3.19 ± 1.2^{b}	4.94 ± 0.54^{c}	3.48 ± 0.79^{B}	41.01 ± 3.53^{ba}	42 ± 1.83^{bc}	0.16 ± 0.098^{d}

Concerning the quality forage, hay meadows are composed of 89.34% of grasses, 4.83% legumes and 5.30% of other plants (mainly Compositae, crucifers, buckwheat, and Ranunculaceae).

Regarding the chemical composition and energy content, the results obtained (Table 1) are related to the gradient of aridity. Northern grasslands exhibit higher performance compared to the southern grasslands for all parameters investigated: MM and TNM. However on the membrane constituents, the average CF contents are higher in southern than in northern grasslands with a difference of 6.27%. The same trend is observed for the energy that depends

strongly on the OMD, and the average energy value of grassland is 0.33 UF/kg DM (UF: forage units), and is similar in both regions.

The grazed fallow species composition is more balanced. It is characterized by the presence of grasses, legumes and other plants (Compositae), which account for 39.66%, 9.44% and 50.91% respectively, and vary in relation to the previous crop, the fertilization and the phytosanitary treatments. Grazed fallows are used at early stages, and are higher in TNM, MM and are among the most digestible forage due to the high percentage of OMD and the energy value of about 0.45 UF/kg MS (Table 1). Culms of barley and wheat showed low MM and TNM (Table 1), where as the level of CF registered, limits the digestibility of organic matter (41 and 42% respectively for barley and wheat), but the energy value is significantly different between the two types of resources.

However, there is variability in relation to the level of aridity: the stubble of barley in the North record higher levels of OMD (45%) compared to the South (38%). But the stubble of wheat again record similar levels, not depending on the region

IV – Conclusion

From the results, it appears that there is a marked quantitative and qualitative variability between the different sources studied, and the same variation is observed between bioclimatic zones. It also appears that the fields are of great interest as important resources to feed supplies. From the perspective of production, grasslands of the North produce higher quantities compared to the South, while the nutritional values are comparable between the two regions, due to the delay in the operations of mowing.

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