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# Seasonal changes of quantitative and qualitative performances of 72 tall fescue populations in Algeria

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**RESUME** – "Variations saisonnières des performances productives et qualitatives de 72 populations de féruque élevée en Algérie". En Algérie, les principales sources d'alimentation du cheptel sont la végétation des jachères pâturées, les parcours steppiques et les résidus de récolte. La part des fourrages verts dans la ration est très faible, voire absente durant une grande période de l'année. Il existe pourtant de larges possibilités pour le développement des fourrages verts. C'est dans ce but que nous avons entrepris cette étude sur des populations locales et introduites de féruque élevée. Les caractères étudiés portent sur le rendement en vert, en sec, la teneur en matière sèche ainsi que les caractères de développement. Les résultats obtenus montrent la supériorité des populations locales et tunisiennes et 4 des 20 variétés nous ont paru très performantes. Ce travail a montré l'importance des variétés autochtones dans l'enrichissement du système fourrager en introduisant des prairies temporaires à base d'une ou de deux espèces en mélange ou en culture pure.

**Mots-clés** : Ressources génétiques, graminée fourragère, féruque élevée, rendement, valeur nutritive.

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## Introduction

The permanent grasslands represent an ideal shape of development of grounds. They get some feed for animals, are an important landscape element and are a source of biodiversity (Carlen *et al.*, 1998). Next to these natural grasslands, the man cultivates more and more artificial meadows. However, according to Hamadache (1989) one of the particularities of the fodder system of north Algeria is the total absence of this type of grasslands, our livestock realise upon with residues of harvest, vetch-oat mixture and in the pasture. This feed does not supply animals with the necessary energy and protein. Thus, it is urgent to study and likely to cover the animals needs even during the dry periods of the year. Tall fescue is the one of the species which we worked on in INA. It is a very productive, tolerast to abiotic stress, grows in summer, coping the aridity and regrows after the first rains.

## Material and methods

The experiment was driven to EL Harrach (sub humid bioclimatic stage, altitude: 59 m.a.s.l, annual rainfall: 643.9 mm in 1994/95; 752.9 mm in 1995/96 and 423.8 mm in 1996/97). The material contains 56 spontaneous populations and 20 varieties of tall fescue, resulting from a collection made by the INA Algiers, the ITGC and the INRA France in 1988 and supply by the INRA France: 8 populations from Algeria, 10 from Tunisia, 14 from Morocco, 15 from France and 6 from Portugal. The trial was sown in December, 1994 in plots of 2 lines of 1 m each one with 0.3 m between them, at the rate of 300 seeds by line. No irrigation was provided. We did 8 cuts during 3 years. We measured dry matter yield (RS) in t/ha and dry matter content (MS) in %. Total nitrogen and raw cellulosis were measured according to standard procedures. Analysis of variances and correlation were performed.

## Results and discussions

The analysis of variance showed significant differences among populations for most studied characters, with positive correlations between the yield and the development traits (plant height and leaf length) for all the cycles. In the first cut, the best dry matter yield was 5.74 t MS/ha for Lunibelle and 3.01 t MS/ha for the Algerian population 5718A (Table 1). Algerian and Tunisian populations were more successful during dry periods that is in cuts 4, 6 and 7. They can be used in dry conditions

without any risk of disappearance. In the cycle 3 made in March 1996, best productions was obtained thanks to exceptional pluviometry wich characterised the winter 1996. The biomass produced in every cut was influenced by the climatic conditions of the previous cut. Indeed, tall fescue grows well in dry conditions, but the number of productive cuts depends on the water availability (Madaci, 1979). The 4 varieties were very productive, especially Lunibelle which was the earliest, persistent and the most homogeneous among the 20 cultivars on 8 cuts. The introduction in Algeria is recommended (Mohguen et Abdelguerfi, 1999). The date and stage of cutting are very important for many items. Mansat (1968) indicates that an exploitation of tall fescue which start in the heading stage get a better total production, and than the first cut in the bloom stage allows generally to harvest more feed. The total production of local population showed that the population 5721A from Annaba's region came first among the Algerian populations, it produced 2.94 t MS/ha in cut1 (Table 1). These results indicate the production pattern during the cycles.

Table 1. Dry matter yield an dry matter content for two populations during 7 cuts

	CUT1		CUT2		CUT3		CUT4		CUT5		CUT6		CUT7	
	Lun	5721A	Lun	5721A	Lun	5721A	Lun	5721A	Lun	5721A	Lun	5721A	Lun	5721A
RS	5.74	2.94	5.44	3.3	10.56	10.64	10.61	11.78	4.63	3.88	4.38	3.38	3.22	3.69
MS	34.68	34.31	20.94	19.83	17.6	21.22	29.33	40.34	21.27	23.31	32.78	38.69	22.97	24.06

The dry matter rate varied with the date of cutting. It was very high in dry periods (cuts 1, 3, 4, 7, 8) and lower in cuts 2, 5 and 6 representing respectively the winter, autumn and spring periods. In grasses this content is generally between 15 and 20%.

The feeding behaviour of animals is sensitive to the concentration of the dry material of the feed which depends on the stage of development and the date of cutting (Gaillard and Ruffin, 1975). For tall fescue, it should be 20 % in the heading stage (Table 1). The high contents are due to the fact that the harvested herb was exclusively highly lignified stems.

The age of stems also strongly influence the quality of the shoot. Indeed we noted the content in total nitrogen was highest in the second cycle. The raw cellulosis content varied in the opposite way, the highest contents being obtained in the warm periods (cuttings: 1, 3 et 4).

## Conclusion

The main part of our results shows that all Algerian populations and the varieties Lunibelle, Lutine, Lim and Lironde were very favourable in a system including the cattle breeding area and the crop cereal. They showed a very big variation and adaptation in the conditions of the trial. Through our study we showed that it is possible to develop our grasslands by introducing new varieties and using our local resources which were poorly exploited up to now.

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