Annual ryegrass yields under supplemental irrigation

M.E.V.L. Lourenço*, P.M.M. Palma*, L.L. Silva** and V. M.L. Massa*
*Universidade de Évora, Departamento de Fitotecnia, Apartado 94, 7002-554 Évora, Portugal
e-mail: melouren@uevora.pt, pmmp@uevora.pt, vitormassa@portugalmail.pt
**Universidade de Évora, Departamento de Engenharia Rural, Apartado 94, 7002-554 Évora, Portugal, e-mail: llsiiva@uevora.pt

SUMMARY - A two-year field trial was conducted to evaluate the effect of supplemental irrigation on increasing and stabilizing yield and quality of forage produced by annual ryegrass in southern Portugal. The following four irrigation treatments were tested: rainfed (control), and irrigation up to 25%, 50% and 100% of soil water holding capacity. In both years, the importance of irrigation was evident in order to increase and stabilize forage production because even with the lowest amount of water application it was possible to at least double the number of harvests. Also the best response was reached for the 100% treatment. The beneficial effect of increasing water application was more noticeable in the second year. Crude protein and digestible dry matter yields showed similar responses to dry matter yield, except in the first year for crude protein yield, whose values were not significantly different between the three irrigation treatments.

Keywords: Productivity, nutritive value, annual ryegrass.

INTRODUCTION

In southern Portugal, annual ryegrass (Lolium multiflorum Lam.) yield is strongly affected by soil water availability in early autumn and especially late spring. This species is usually cultivated under rainfed conditions allowing usually for two harvests. Lourenço and Palma (2001) reported total dry matter yield values ranging from 5274 to 6790 kg ha⁻¹. In another work, the same authors (2005) presented also values, but lower than 3500 kg ha⁻¹. This shows the great variability of forage production of the region depending mostly on total amount and rainfall distribution along the year. Supplemental irrigation can increase and stabilize yields, but since water is becoming an expensive resource, it is important to investigate the response of this species to irrigation.

MATERIAL AND METHODS

The experiment was conducted in 2003/04 and 2004/05. The first year, in spite of October being very rainy, was a dry year since the amount of rainfall (433 mm) was lower than the normal (634 mm), just like in 2004/05 (428 mm). On the other hand, in the first year the temperatures were higher than the normal except in October, but in the second, the temperatures only became higher than average after March. The field trials were set up in a luvisol of the Experimental Center of Currais, located near Évora (14 km), with 82 mg kg⁻¹ of P₂O₅, 62 mg kg⁻¹ of K₂O, and pH (H₂O) of 5.78 in 2003, and 91 mg kg⁻¹ of P₂O₅, 96 mg kg⁻¹ of K₂O, and pH (H₂O) of 6.25 in 2004. The following four irrigation...