

# Annual ryegrass yields under supplemental irrigation

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**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.

**RESUME** – "Rendements annuels du ray-grass avec irrigation d'appoint". Une expérience a été conduite, pendant deux ans, pour évaluer l'effet d'une irrigation additionnelle pour augmenter et stabiliser la production et la qualité du fourrage produit par le ray-gras d'Italie au sud du Portugal. On a testé les traitements suivants: sans arrosage (témoin), et arrosage de 25%, 50% et 100% de la capacité de captation d'eau du terrain. Pendant les deux années, il a été mis en évidence l'importance de l'irrigation pour augmenter et stabiliser la production fourragère parce qu'avec la plus petite irrigation appliquée, on a doublé le nombre de coupes. La meilleure réponse a été atteinte avec l'irrigation de 100%. À la seconde année on a vu un effet bénéfique plus notable avec les augmentations d'eau appliquées. Pour les productions de protéine brute et de matière sèche digestible on a obtenu des réponses similaires à celles de la production de matière sèche, excepté pour la production de protéine brute lors de la première année, avec des valeurs qui n'ont pas montré de différences significatives pour les trois traitements d'irrigation.

**Mots-clés :** Productivité, valeur nutritive, ray-grass d'Italie.

## 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<sup>-1</sup>. In another work, the same authors (2005) presented also values, but lower than 3500 kg ha<sup>-1</sup>. 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 and scarce 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<sup>-1</sup> of P<sub>2</sub>O<sub>5</sub>, 62 mg kg<sup>-1</sup> of K<sub>2</sub>O, and pH (H<sub>2</sub>O) of 5.78 in 2003, and 120 mg kg<sup>-1</sup> of P<sub>2</sub>O<sub>5</sub>, 96 mg kg<sup>-1</sup> of K<sub>2</sub>O, and pH (H<sub>2</sub>O) of 6.25 in 2004. The following four irrigation