# *Digitaria eriantha* under water deficiency

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Research on dryland pastures in the semiarid regions of Argentina has concentrated mainly on aspects such as potential production related to quantity and quality as well as fertilization requirements .But since soil water is the most limiting environmental factor that affects plant production in these areas , the water use efficiency and the quality of the pasture under water limited conditions should be considered .Even if water stress is the most important physical limitation to plant yield there are contradictory results about its effect on nutritive value .

*Digitaria eriantha* is a highly palatable perennial C4 grass which can be grown in most of the semiarid areas of Argentina .It has the potential to become one of the most widely pasture grass in those areas .The climate during its growing season is characterized by considerable fluctuations of rainfall .Water stress effects on *D .eriantha* quality has not been studied .

The purpose of this study was to determine the effect of moisture regimes on yield , water use efficiency and quality of *D . eriantha* .

This study was conducted at the greenhouse and the experimental field of the Universidad Nacional del Sur at Bahía Blanca (38° 44′S 62°15′W) .The soil was a typical ustipsament with a petrocalcic layer and a loamy-sand texture .*D .eriantha* cv .Irene was used .

There were three treatments at the field : 1) no irrigation , 2) irrigated every 7 days , and 3) irrigated every 14 days .

A randomized complete block design was used .

Plots were 5 .0×2 .8 m and there were 6 replicaes for each treatment .

There were also 3 treatments in the greenhouse : a) 100% , 2) 75% and 3) 50% field capacity .

Forage was dried at 65°C , weighed and ground for chemical analysis .Nitrogen was determined by the semimicro-Kjeldahl method (Bremmer , 1996) and then multiplied by 6 .25 to obtain crude protein (CP) , phosphorus concentration was obtained by Murphy and Riley (1962) .

*In vitro* dry matter digestibility was determined by Terry and Tilley (1964) , neutral and acid detergent fiber and lignin by Van Soest *et al* (1991) .

There was a good correlation between yield and the availability of soil water .The production of *D .eriantha* with 75 and 50% of field capacity was reduced 81 and 56% compared to treatment of 100% of field capacity .The water use efficiency was 6 .38 kg $ha^{-1}$ $mm^{-1}$ .

Water stress had a smaller effect on forage quality than on growth .Drought reduced the seasonal decline in digstibility (IVDMD) by reducing the rate of increase in acid detergent fiber and lignin compared to non-stressed plantas .This can be due to a delay in plant growth .

Water deficit decreased the rate of seasonal decline in nitrogen content , may be by a decrease in leaf senescense , but there was a reduction of phospohours concentration .

The response of plants to water stress depends on the time of the stress .Most of the effects on forage quality were positive , may be due to a delay in maturity caused by water stress .At later times the stress accelerate the maturation .

**References**

Bremmer , J .M .1996 .Nitrogen total .In : Methods of soil analysis .Part 3 .Chemical methods . *Soil Science Society of America , Madison* , Wi , USA .

Murphy , J .and J .P .Riley .1962 . A modified single solution method for the determination of phosphate in natural waters . Analytical Chimica Acta 27 : 31-36 .

Tilley , J .M .A .and R .A .Terry .1963 .A two-stage technique for the *in vitro* digestion of forage crops .*J .British Grassland Society* 18 : 104-111 .

Van Soest , P . , J . Robertson and B . Lewis . 1991 . Methods for dietary fiber , neutral detergent fiber and non starch polysaccharides in relation to animal nutrition . *J .Dairy Science* 74 : 3583-3597 .