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Nitrogen plus Phosphorus fertilization increases forage yield of *Tripsacum dactyloides* (L.) L. (Eastern gamagrass)

*T. dactyloides (*Eastern gamagrass), a close relative of maize, is a warm-season, perennial forage grass with high productivity and tolerance to several soil adversities. The aim of this study was to compare tiller number dynamics and forage yield of three *T. dactyloides* genotypes unfertilized or with the addition of nitrogen and nitrogen plus phosphorus, during the second year of crop production.

Genotypes used in this study were diploid cultivars Iuka and Pete, kindly supplied by Dr. Maria Haytt (Iowa State University) and a tetraploid genotype (GT) from CIMMYT (Mexico). The research was conducted at the Instituto Fitotécnico de Santa Catalina, Facultad de Ciencias Agrarias y Forestales, Universidad Nacional de La Plata, Llavallol, Buenos Aires (34 º 48' S, 48 º 31' W). Planting was made on June 14th 2007 (to fulfill the period of low temperatures required to alleviate caryopsis dormancy). Field trials were established on a Typic Argiudoll soil which showed 32 g kg^{-1} organic matter and pH = 6. Seeds were planted approximately 3-4 cm deep in rows 0.7 m apart, spaced 0.2 m in the row. Weeds were controlled mechanically during the post-emergence period. Plants were fertilized on November 20th, 2009. During the growth period, the accumulated rainfall (September 15th, 2009 to April 6th, 2010) was 971.9 mm and the mean temperature was 20.3 º C. Gamagrass was cut by hand to 0.2 m stubble. Plants were cut whenever they attained a height of 0.8 m. Four harvests were carried out during the growing season, on November 20th and December 18th, 2009 and February 15th and April 06th, 2010. Emerged tillers were counted on October 16th and December 14th, 2009 and March 16th, 2010. Trials were conducted in a randomized complete block design with a factorial arrangement of treatments in three replicates. Factors included genotype (3 levels) and fertilization treatment (3 levels). Fertilization treatments were control (without fertilization), urea (217.39 kg ha^{-1}) and diammonium phosphate (DAP) + urea (200 kg ha^{-1} + 140.46 kg ha^{-1}, respectively). The last two treatments provided equal doses of nitrogen each (100 kg ha^{-1}). Genotype was

the main plot treatment (plot size: 6.3 m by 8 m), and fertilization was the subplot treatment (plot size: 2.1 m by 8 m). The data were subjected to analysis of variance, and significant differences among the means and treatments were compared by Tuckey test at 5% level using the Infostat software package (InfoStat, 2008. InfoStat Group, FCA, Universidad Nacional de Córdoba, Argentina).

The number of tillers plant^{-1} was not affected by the genotype but varied during the growing season. Interaction between genotype and date was not significant. The number of tillers plant^{-1} (mean ± SE) decreased ≅50% from October to December (from 53,7 ± 2,94 to 27,3 ± 1,26, respectively) and then it remains stable up to March 16th (26,7 ± 1,42). Both factors, genotype and fertilization, affected the number of tillers plant^{-1} and total forage yield (expressed as dry matter: DM). Genotype x fertilization interaction was not significant for both parameters. The number of tillers plant^{-1} (media ± EEM) of GT (25 ± 0.9) was lower than that of the cultivars Iuka and Pete (34 ± 2.32 y 32 ± 2.04, respectively). The number of tillers plant^{-1} increased significantly in urea fertilized plants (34 ± 3.02) compared to control ones (27 ± 0.93). Urea+DAP fertilized plants showed intermediate values (29 ± 1.31). Urea + DAP treatment induced significant increased of DM compared to the control one (mean ± SE, in kg ha^{-1}) (24757 ± 1497 *vs.* 19931 ± 1321). Urea fertilized plants showed intermediate values (22098 ± 1798). GT genotype and cv. Pete showed the higher (24836 ± 1306) and the lower (20213 ± 1241) DM production, respectively. DM produced by cv. Iuka showed intermediate values (22461 ± 1535) (Figure 1).

These results show the potential of this species, especially the tetraploid genotype, in terms of high biomass production. Further studies are necessary to determine the usefulness of this species as a forage resource for the area, mainly its performance under more restrictive soil conditions as well as its nutritional quality.

Figure 1. Forage yield (dry matter) of three *Tripsacum dactyloides* genotypes unfertilized (control) or fertilized with N (217.39 kg ha^{-1} urea) and N+P (200 kg ha^{-1} DAP + 140.46 kg ha^{-1} urea). Vertical bars indicate the mean ± SE.