

BIOMASS AND N CONTRIBUTION OF SUNN HEMP (*Crotalaria juncea* L.) ON AN OXISOL IN PUERTO RICO



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Abstract

Sunn hemp (*Crotalaria juncea* L.) has a fast growth and high N₂ fixation ability, justifying its use on degraded soils in the tropic to improve soil fertility. However, there is little information on time of planting as well as date of harvest to maximize biomass production in Puerto Rico. The objective of this study was to assess June and November plantings of cv. Tropic Sun and three harvest dates effects on biomass and N contribution. Tropic Sun was seeded (10 kg ha⁻¹) on a Oxisol (Cotito series) at the Agricultural sub-station of Isabela, University of Puerto Rico. At 10, 13 and 17-wks after planting, biomass was estimated in a marked 1 m² by clipping at 15-cm height and fresh weight taken. Subsamples (500 g) were taken and dried in an open aired oven at 60° for 48 h to determine dry matter percentage and then ground to pass 1 mm sieve. Ground samples were used for N analysis following the procedures of AOAC (1990). Data was analyzed using SAS (1999). There was time of planting effects (P<0.05) on biomass. Maximum biomass was produced at the June planting and 17-wk harvest (20 Mg ha⁻¹) and was three times higher than for the November planting (6.0 Mg ha⁻¹). When comparing date of harvest, biomass at the 10-wk in June exceeded the 10-wk November harvest by 6 Mg ha⁻¹, suggesting that Tropic Sun is highly photoperiodic. Because of higher yield for the June planting, N contribution differed (P<0.05) surpassing 400 kg ha⁻¹ for the 17-wk harvest. N concentration differed when the upper and lower canopy was compared. Mean values were 2.67 and 0.64% for upper and lower canopy, respectively. Sunn hemp was more productive in the June than November planting. The 17-wk harvest doubled its biomass compared to the 10-wk harvest in June, but was not as evident for the November planting during the same period. In summary, Sunn hemp is a productive legume that can be used for weed control and incorporated in rotational cereal grain planting in Puerto Rico. However, litter decomposition and N mineralization of upper and lower canopy needs to be determined.

Introduction

- Sunn hemp (*Crotalaria juncea* L.) has a fast growth and high N₂ fixation ability, justifying its use on degraded soils in the tropic to improve soil fertility.
- In 1983, Tropic Sun cv. was released in Hawaii and has since been used as a multipurpose crop.
- However, there is little information on time of planting as well as date of harvest to maximize biomass production in Puerto Rico.

Objectives

- Assess June and November plantings of cv. Tropic Sun and three harvest dates effects on biomass and N contribution on an oxisol in north-western Puerto Rico.

Materials and Methods

- Tropic Sun was seeded (10 kg ha⁻¹) on a Oxisol (Cotito series) at the Agricultural sub-station of Isabela, University of Puerto Rico.
- At 10, 13 and 17-wks after planting, biomass was estimated in a marked 1 m² by clipping at 15-cm height and fresh weight taken.
- Subsamples (500 g) were taken and dried in an open aired oven at 60° for 48 h to determine dry matter percentage and then ground to pass 1 mm sieve.
- Upper and lower canopy was hand-separated, dried and ground for N analysis to calculate N contribution.
- Ground samples were used for N analysis following the procedures of AOAC (1990). Data was analyzed using SAS (1999).



Results

- There were significant effects (P<0.05) of planting and harvest dates on dry matter yield (Figure 1). Maximum biomass was produced when planting on June at the 17-wk harvest (20 Mg ha⁻¹).
- N accumulation differed (P<0.05) within dates of planting, with mean values between 132 and 471 kg ha⁻¹ (Figure 2).
- N content differed when comparing canopy positions, with mean values of 2.67 and 0.64% for upper and lower canopy, respectively.

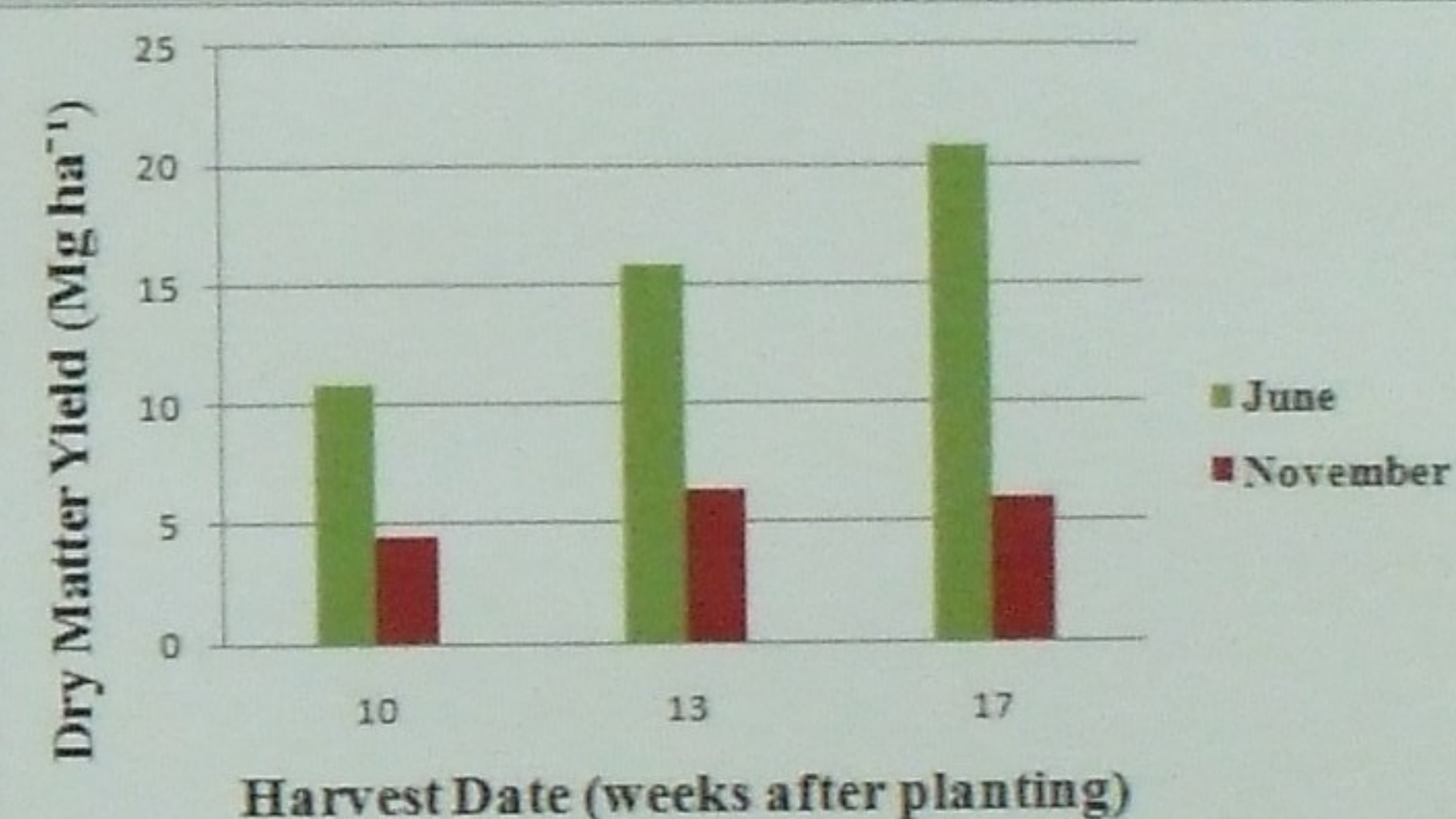


Figure 1. Effect of planting and harvest date on dry matter yield, Isabela, P.R., 2009-2010.

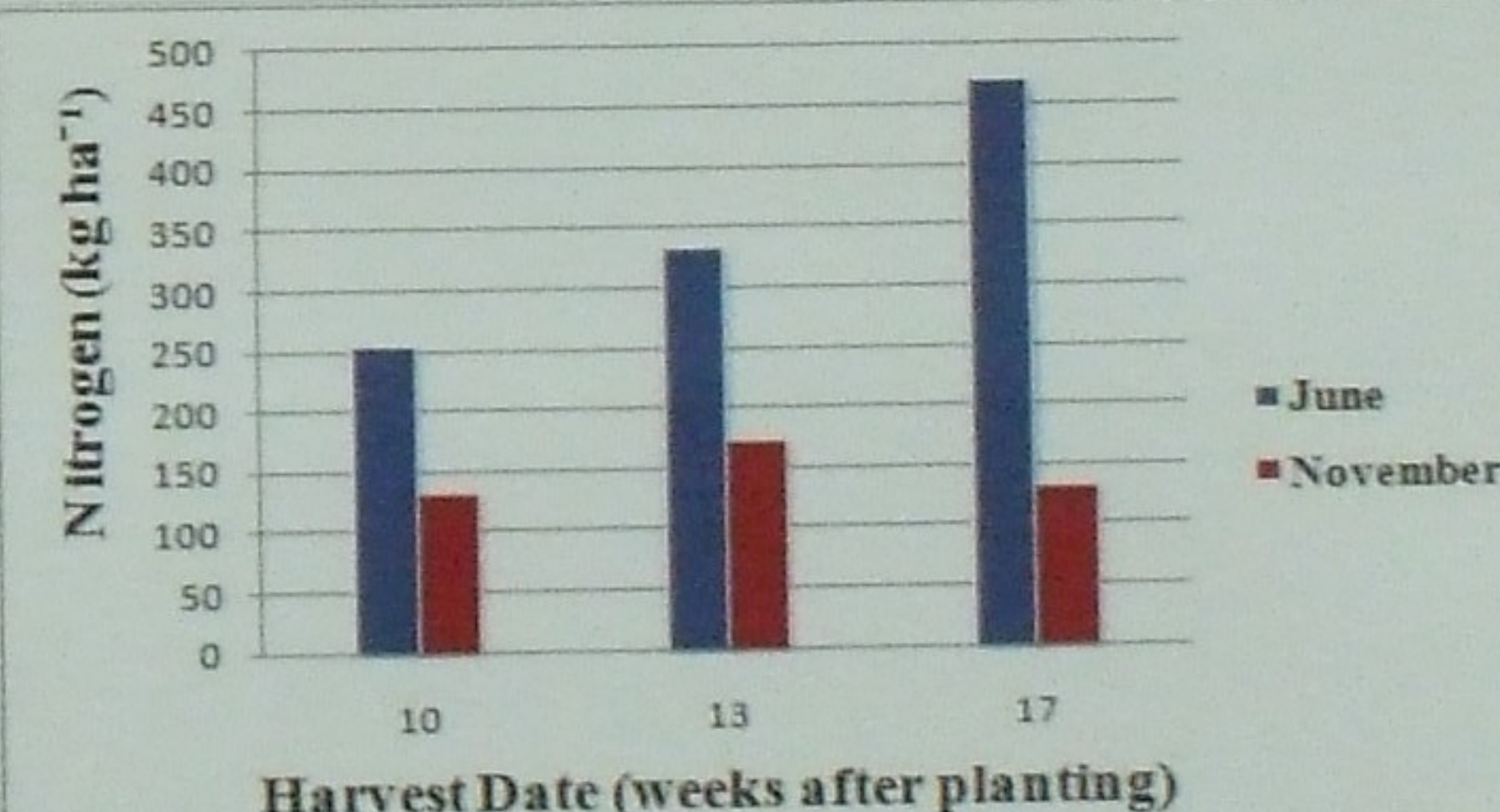


Figure 2. Effect of planting and harvest date on nitrogen content, Isabela, P.R., 2009-2010.

Conclusions

- Sunn hemp is more productive when planted in June.
- Biomass increases twofold from the 10 to 17-wk harvest.
- Sunn hemp can be incorporated in rotational cropping systems for erosion control, weed suppression and to increase N.

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