KENAF BIOMASS PRODUCTION IN EXTREMADURA (SPAIN)

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Abstract

Kenaf (*Hibiscus cannabinus* L., Malvaceae) is a warm season annual fiber crop closely related to cotton (*Gossypium hirsutum* L., Malvaceae). Kenaf has been accepted by the European Union for the "non-food set-aside" and designated for utilization in the production of industrial fiber. The objective of the study has been the determination of the sustainable kenaf yielding potential as a non-food crop in Extremadura. For this aim, trials have been carried out in order to determine the biomass yields of three varieties.

Keywords: Kenaf; Non-food crop; Fiber crop.

1. INTRODUCTION

The Common Agricultural Policy reform is a crucial step in helping European Union farmers to become more market-oriented, and competitive on EU and world markets. The reform will substantially contribute to stablishing farmers incomes and will open at the same time new paths to diversify their enterprises, including a stronger development of non-food agricultural production such as renewable energy resources. Non-food crops can generate new business opportunities in rural areas, providing additional diversity and innovation.

Although kenaf has been accepted by the European Union for the non-food set-aside and designated for utilization in the production of industrial fiber there is no much data concerning the adaptability,

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growth and biomass yields of the crop. There are only few references regarding the agronomic aspects of the crop at European pedoclimatic conditions (Montero de Espinosa, *et al.*, 1996; Ponz, 1995; Petrini, 1995; Pasini, 1995; Oliveros, 1995; Quaranta *et al.*, 2000).

2. MATERIALS AND METHODS

The experiemnts were carried out in 2003 and 2004 in Centro de Investigación Finca La Orden of the Consejeria de Infraestructuras y Desarrollo Tecnológico of Junta de Extremadura, at latitude 38° 51' 10" N and longitude 6° 39' 10" W, characterized by a loam soil. The crop was grown under non-limiting conditions.

Field experiments were carried out in two cycles. Soil was ploughed and harrowed in spring to be physically prepared for sowing. Three kenaf varieties (Salvador, Tainung 2 and Everglades 41) were sowed in may and june and cultivated at two densities (200000 and 400000 plants ha^{-1}). The plants were grown in 8x6 m^2 in a randomised block design with three replicates. A fertilizer complex 8:15:15 (% N, P_2O_5, K_2O) was applied at a rate equivalent to 50 kg N ha^{-1} before planting and urea at a rate of 90 kg N ha^{-1} when plants height was 0.4-0.5 m. Sowing was carried out in groups of two rows 0.60 m apart with 0.15 m between rows. Non-limiting deficit or water stress were observed throughout the crop cycle. Aerial biomass productivity at the end of the crop cycle (october-november) was determined by field samplings. The sampling area was 5 x 1.5 m^2. Aboveground plant material was collected from the sample area and the stems fresh weight was determined. Dry matter content was determined by measuring the sample weight before and after drying until constant dry weight. Biomass production was expressed in stem dry weight ha^{-1} soil surface.

3. RESULTS AND DISCUSSION

Table 1 reports the aerial biomass production results. The stem yields at the end of growth period were: 23.5 t ha^{-1} in 2003 and 21.1 t ha^{-1} in 2004. The biomass yields of the three varieties studied are within the range of the ones mentioned in several experiments carried out in the Mediterranean area.

Table 1. Aerial biomass production (t stem dry matter ha^{-1}) of three kenaf varieties throughout two crop cycles in Extremadura (Southwestern Spain).

Variety	Year 2003	Year 2004
Salvador	21.6	21.0
Tainung 2	26.5	23.5
Everglades 41	22.4	18.7

4. CONCLUSIONS

This research confirmed the potential of kenaf as biomass crop in Extremadura. On a two-year average, the stem dry biomass resulted about 22.3 t ha^{-1}. The possible uses of this biomass can be: paper products, building materials and absorbents.

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