WP2. Adaptability and Productivity Field Trials

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Kenaf

Hibiscus cannabinus L.(Malvaceae)

- Kenaf is a short-day annual herbaceous crop cultivated mainly for its fibrous stem.
- It has been cultivated long, as early as 4000 BC in western Africa.
- Recent research has demonstrated numerous potential uses for each of the two stem materials (bark or core), which often must been separated.
- Its area of cultivation is estimated to about 200,000 ha (FAO) and the main producers are Thailand, China, India and Mexico.



WP2. Adaptability and Productivity Trials

The **main aim** of this work package is determine the sustainable yielding potential of kenaf as an energy crop, at different locations in Southern Europe.

WP2 consists of four tasks:

- Task 2.1: Screening trial
- Task 2.2: Effect of sowing dates and plant populations on biomass yields
- Task 2.3: Effect of irrigation and nitrogen fertilisation on biomass yields
- Task 2.4: Kenaf field trials with size of 2ha



Details of the experimental trials

Experimental field trials	Partners involved	Factors under study	Experimental design	Plot size
Screening trial	1	Six kenaf varieties	Randomized complete block design in three blocks	6x8 m²
Sowing times and plant populations	1,2,3,5,6, 7,10,11	2 varieties 2 sowing times 2 plant populations	A split-split split plot design in three blocks	6x8 m²
Irrigation and nitrogen fertilization effects	1,2,3,5,6, 7,10,11	3 irrigation rates 4 nitrogen fertilisation rates	A split-split split plot design in three blocks	6x8 m²
2 ha kenaf field trial	1,6,10 (year 3 of the trial)	The best-performed variety will be sown under the best plant population and will be irrigated and fertilized according to the results from the previous trials		

CRES contribution

- ✓ Task 2.1: Screening trial
- ✓ Task 2.2: Sowing dates and plant populations
- ✓ Task 2.3: Irrigation and fertilization rates
- ✓ Task 2.4: 2 ha field



Site description

Location: Aliartos (central Greece) Site coordinates: Latitude 38° 22', longitude 23° 10' and altitude 114 m above the sea level Climate: Dry with a mean yearly precipitation less than 400 mm. Soil: SL with relatively low organic matter

Soil analysis will be carried out before sowing. A basic fertilization will be applied based on the results of the soil analysis.



Monthly precipitation (mm) and temperature (°C) in Aliartos (long-term mean)





Task 2.1: Screening trial

- * This trial will be carried out only by CRES.
- * Up to now there is available seed from six varieties, which are:

Everglades 41 (late variety that produce reasonable fiber production and a cotton-like leaf shape) Tainung 2 (late variety, with superior raw fiber production and palmate leaf shape) Gregg (is a new variety with slightly longer growing period that may contributes to greater fiber production and palmate leaf shape) Dowling (new variety, that may prove to be a very high fiber producer with non-palmate leaf shape) SF 459 (new variety that is favored for soils with nematode problem and palmate leaf shape)

G4 (it is considered as a photoperiod-insensitive variety that combines a short maturity cycle (100-130 days between emergence and flowering) and high productivity when grown in the Mediterranean region)







Experimental layout of Task 2.2 Sowing times and plant populations











- The size of each plot will be 6×8m (48m²)
- The distance between the rows will be 50 cm and within the rows 5 cm for the density of 400,000 plants/ha and 10 cm for the density of 200,000 plants/ha.
- A total number of 16 rows will be sown in each plot.

Experimental layout of Task 2.3 Irrigation and nitrogen fertilization rates





Experimental plot of Task 2.3 Irrigation and nitrogen fertilization rates



- The size of each plot will be 6×8m (48m²)
- The distance between the rows will be 50 cm and within the rows 10 cm (200,000 plants/ha).
- One variety will be sown (Tainung 2 or Everglades 41).
- A total number of 16 rows will be sown in each plot.



During all growing seasons the following data will be collected:

Meteorological data (an automatic weather station will collect the following data)

- $\checkmark\,$ daily maximum and minimum air temperature
- \checkmark global radiation
- \checkmark precipitation
- \checkmark air humidity
- \checkmark wind speed
- \checkmark evaporation from a glass "A" panel

Phenological data

- ✓ date of emergence (50 and 100%)
- $\checkmark\,$ date of flowering (50 and 100%)
- $\checkmark\,$ date of seed maturity (50 and 100%)



During all growing seasons the following data will be collected

Growth data

- ✓ plant height (on five plants per plot)
- ✓ stem diameter (on five plants per plot)
- ✓ leaf area meter

Productivity data

A number of harvests will be carried out (every 20 days) in order to determine the fresh and dry matter yields and plant components

Possible dates of harvest:

10/7, 30/7, 20/8, 10/9, 30/9, 20/10, **10/11**, 30/11, 10/12, end of the year

In each harvest date the harvest row will be 1.5 m.

