BIOMASS PRODUCTION CHAIN AND GROWTH SIMULATION MODEL FOR KENAF

BIOKENAF
QLK5 CT2002 01729

CETA

Centro di Ecologia Teorica ed Applicata

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LISBOA,

23-24 SEPTEMBER 2004

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CETA, Italy (5)

- **WP 2:** Adaptability and Productivity Field Trials
  - Task 2.4: Kenaf Field Trials with Size 2 ha
- **WP 4:** Harvesting and Storage Trials
  - Task 4.1: Harvesting Trial
  - Task 4.2: Storage Trial

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SITE DESCRIPTION

Cervignano del Friuli (UD)

North East Italy

- Latitude: 45° 51′ N
- Longitude: 13° 20′ E
- Altitude: 8 m above sea level
- Soil texture: fine silty-clayey soil

PRE-SOWING WORKS

- Plowing
- Harrowing
  - (Seedbed Preparation)

25/03/2004

06/05/2004

BESIDES:

- No Chemical Fertilisation
- No Chemical Herbicide
- No Irrigation

SEEDBED

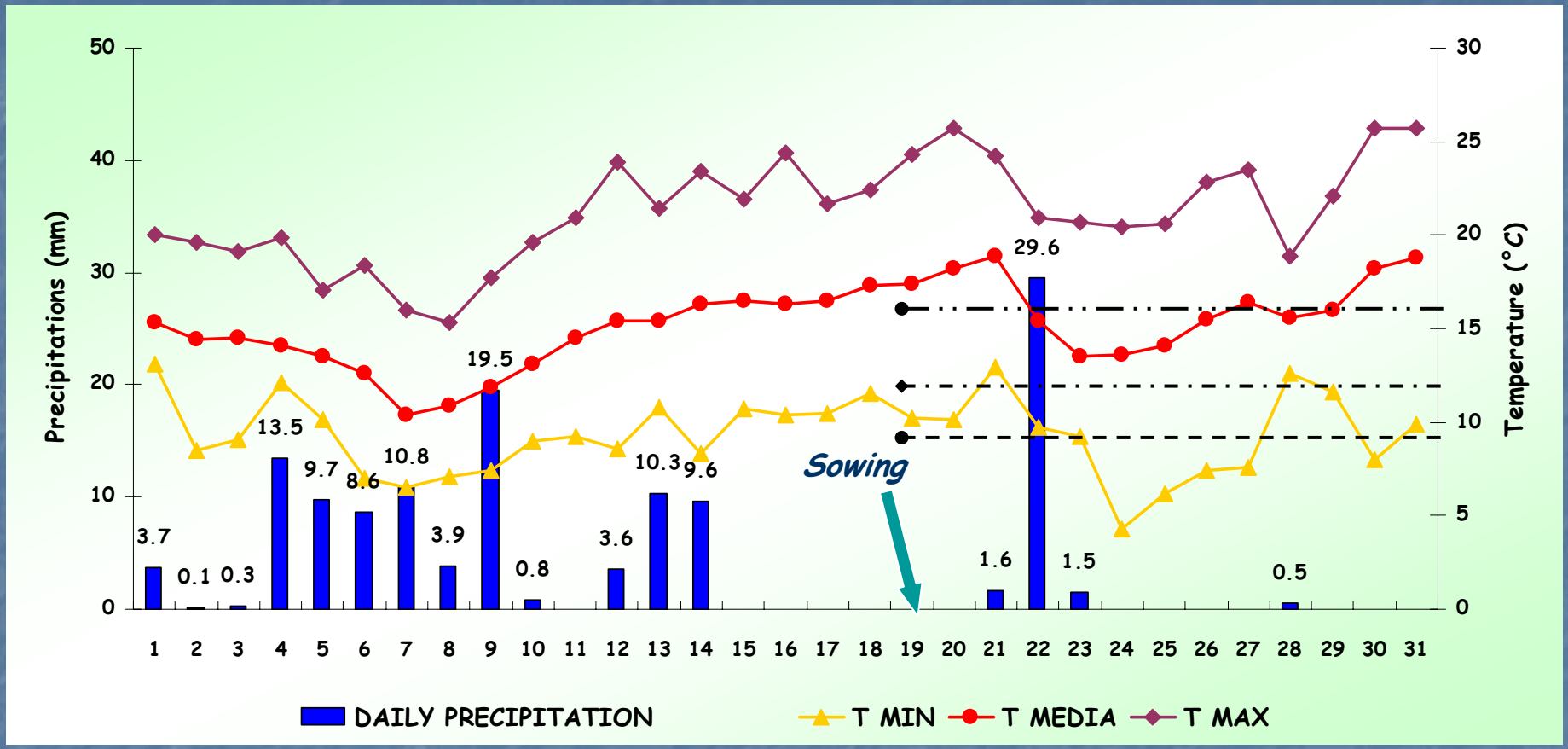
19/05/2004

GERMINATION TRIAL

- SEED GERMINATED IN VITRO:
  - 90%

- SEED GERMINATED IN SOIL:
  - 85%

CLIMATIC CONDITION IN MAY



- 9°C MINIMUM GERMINATION TEMPERATURE
- 12°C MINIMUM TEMPERATURE FOR A GOOD GERMINATION
- 16°C MINIMUM GROWTH TEMPERATURE

SOWING PARAMETERS

KENAF VARIETY	EVERGLADES 41
DATA	19/05/2004 (ten days before last year first sowing)
FIELD SIZE	1,50 ha
PLANT POPULATION	440.000 plants/ha (to obtain 400.000 plants/ha)
SPACE BETWEEN PLANTS	5 cm X 45 cm
SOWING DEPTH	3 – 4 cm
QUANTITY OF SEEDS USED	20 Kg
WORKING DURATION	35 minutes (one hour to change sowing disk: 72 hole Ø 2.5 mm)

KENAF GERMINATION

Six days after sowing

24th May, 2004

KENAF DEVELOPMENT

11th June 2004

23 days after sowing

Average plant height:
6-7 cm

KENAF DEVELOPMENT

29th June 2004 (41 days after sowing)

Average plant height: 35 cm

KENAF DEVELOPMENT

Kenaf plant unhomogeneity development

- Plant height range:
  20 cm - 45 cm

about 20 cm

up to 45 cm

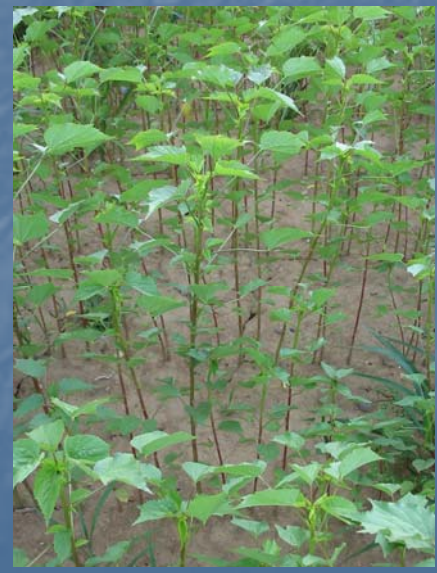
KENAF DEVELOPMENT

- 6th July 2004 (48 days after sowing)
  - Average stem height: 48,5 cm
  - Average stem diameter: 5,6 mm

KENAF DEVELOPMENT

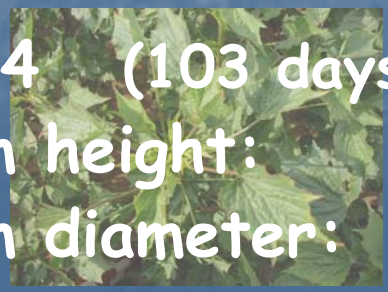
- 29th July 2004 (71 days after sowing)
  - Average stem height: 61 cm
  - Average stem diameter: 7,3 mm

KENAF DEVELOPMENT



- 18th August 2004 (91 days after sowing)
  - Average stem height: 85 cm
  - Average stem diameter: 9,7 mm

KENAF DEVELOPMENT



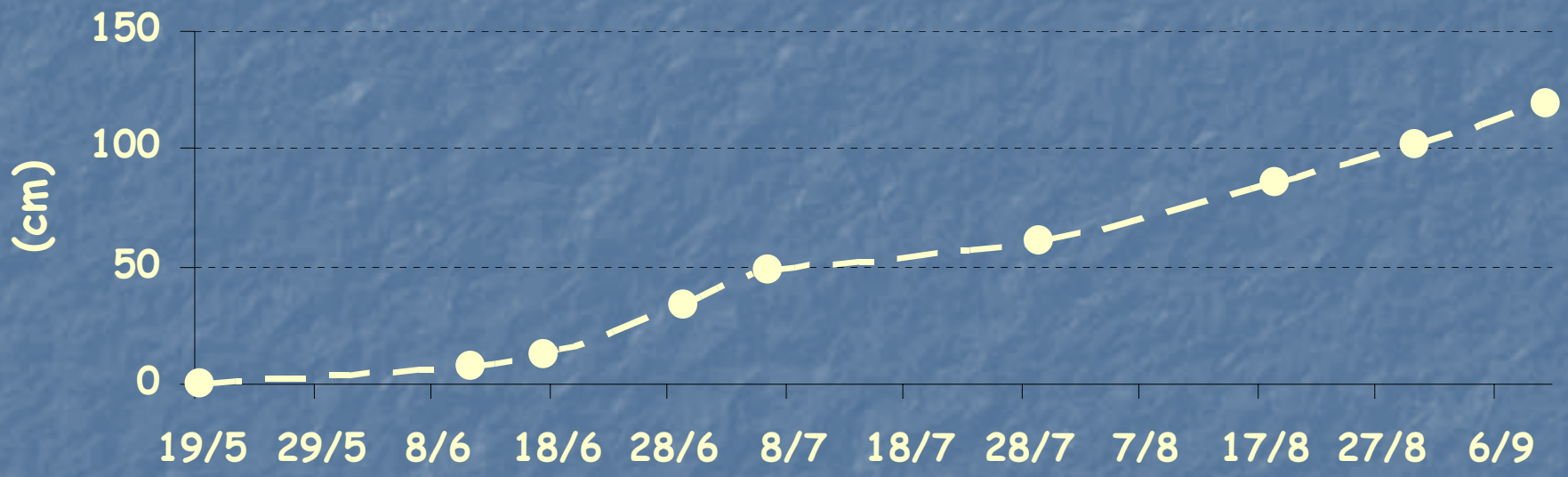
- 30th August 2004 (103 days after sowing)
  - Average stem height: 101,5 cm
  - Average stem diameter: 10,8 mm

KENAF DEVELOPMENT

- 10th September 2004 (114 days after sowing)
  - Average stem height: 119 cm
  - Average stem diameter: 11,7 mm

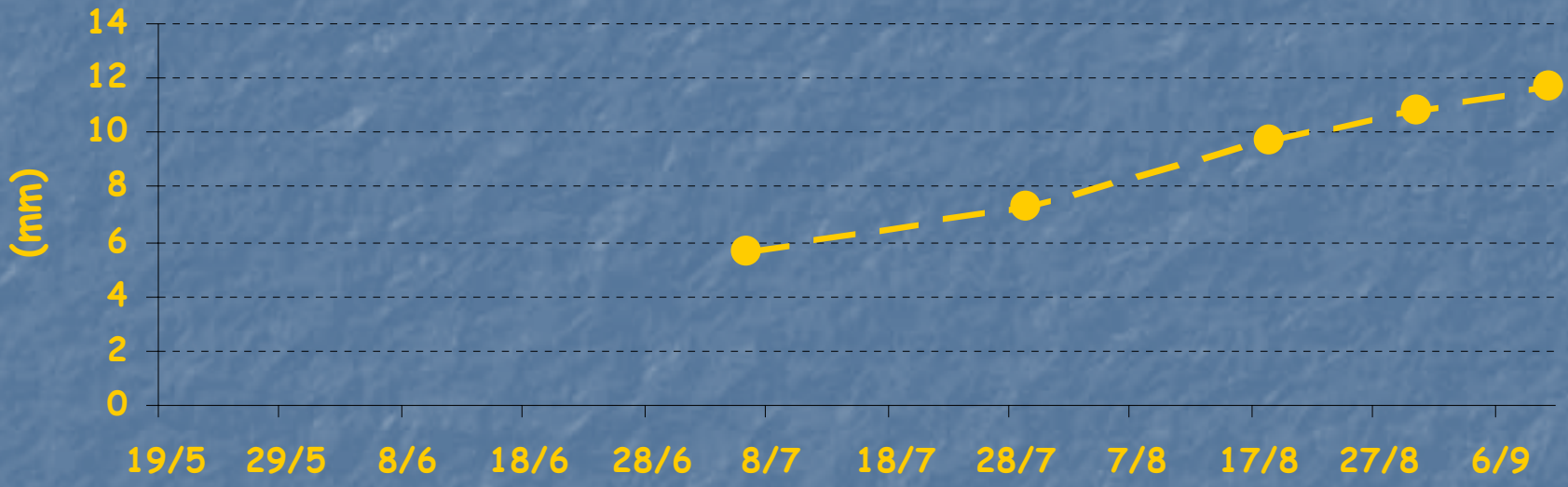
KENAF DEVELOPMENT

MEDIUM PLANT HEIGHT

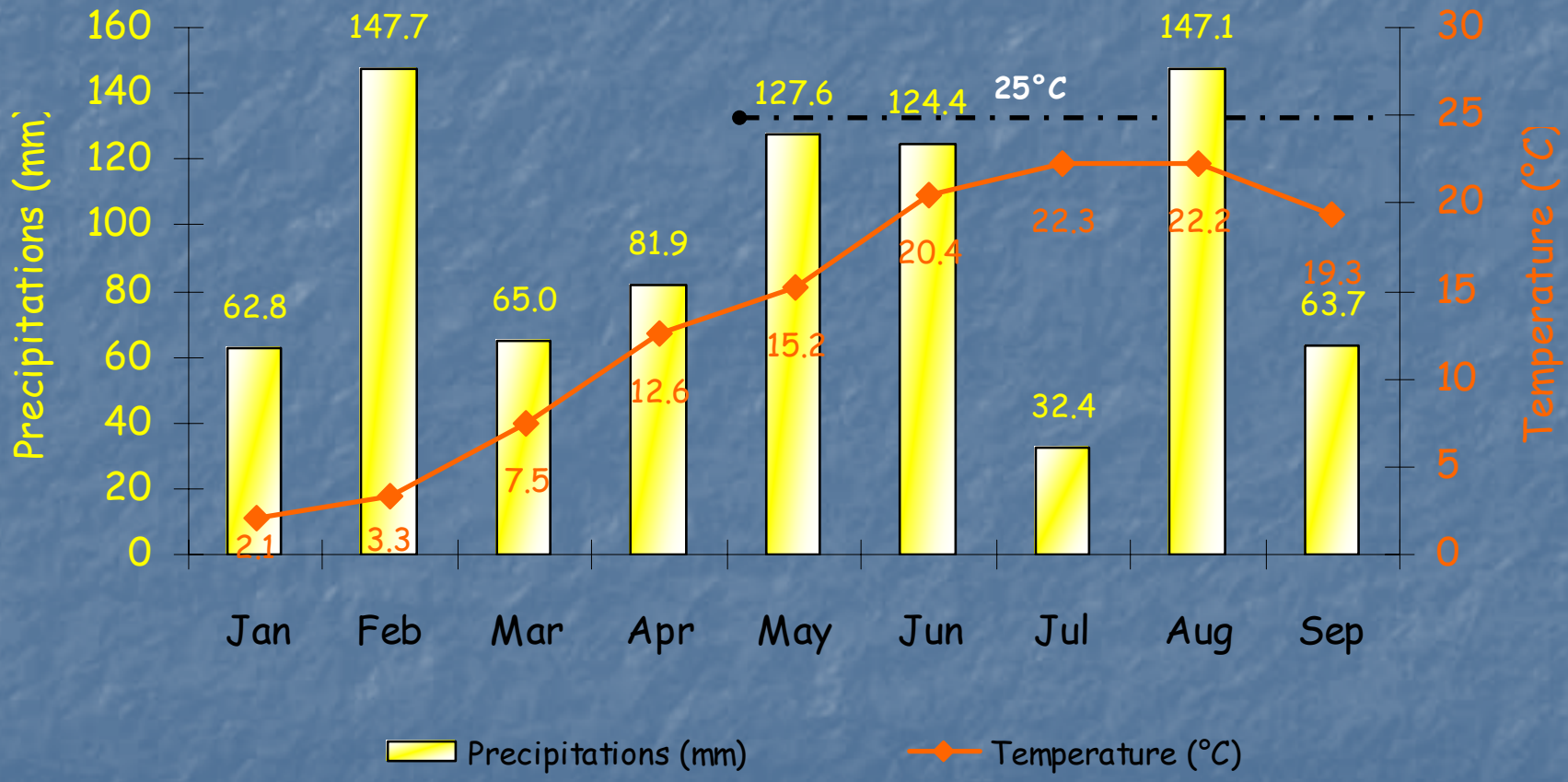


KENAF DEVELOPMENT

MEDIUM STEM DIAMETER



Temperature (°C) and Monthly Precipitation (mm) in Cervignano del Friuli



- 25-26°C OPTIMUM GROWTH TEMPERATURE

CURRENT KENAF FIELD SITUATION
(13/09/2004)

		notes
STEM HEIGHT (cm)	119	80 --- 170 (high variability)
BASAL STEM DIAMETER (mm)	11,7	8 --- 18 (high variability)
PLANT POPULATION (plants/ha)	320.000	400.000 (plant population attended)
KENAF YIELD (t)	29,8	Fresh Weight (Stems plus Leaves)
KENAF MOISTURE (%)	79%	Stems and Leaves

KENAF DEVELOPMENT

- 29th July

- 30th August

- 13th September

- It was observed a clear plant development unhomogeneity as early as one month after the seed germination.
- During the vegetative season this problem was more evident. There were areas where average plant height was 80-90 cm and areas where average plant height was 160-170 cm.
- In other areas, plants showed an homogeneous development within the rows but a plant development like waves among rows.
- That could be due to different physical soil characteristics (e.g. some areas presented water stagnation) or to different chemical soil characteristics (some areas presented plants with a low development and pale green colour leaves. That could mean a lower soil nitrogen content).
- The unhomogeneity of height among plant rows could be explained attributed to sowing condition such as sowing depth.

OBSERVATIONS

- Low temperatures after sowing caused a contraction of the expected seed germination. Only the 73% of seeds germinated to obtain a final plant density of 320.000 plants/ha.
- No chemical fertilization.
- No irrigation.
- The high plant population choice, theoretical density of 400.000 plants/ha, didn't allow to develop ramified plants.
- The soil unhomogeneity and sowing conditions probably caused a different kenaf plant development.
- Kenaf plants showed an average stem height lower than last year in spite of a kenaf advanced sowing date (about ten days) and a better water supply.
- These results could be explained by the different plant population chosen, the low medium temperature registered, especially in the third decade of August and the possible different soil characteristics.
- High plant moisture content (79%).
- Leaves and stems are green.

…WILL BE CONTINUING