BIOKENAF – QLK5-CT2002-01729

final meeting
ATHENS, 26-27 February 2007

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INRA main involvement

- ***WP2: Adaptability and productivity field trials***
  - Task 2.2: Effect of different **sowing dates** and **plant populations** on biomass yields
  - Task 2.3: Effect of **irrigation** and **nitrogen fertilisation** on biomass yields

- ***To provide data for:***
  - **WP 3**: Development of the crop growth simulation model
  - **WP 6**: Environmental impact assessment and life cycle analysis of kenaf production and use
  - **WP 7**: Economic analysis for the crop production chain

WP2:
Adaptability and productivity field trials

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1. Presentation of trial conditions

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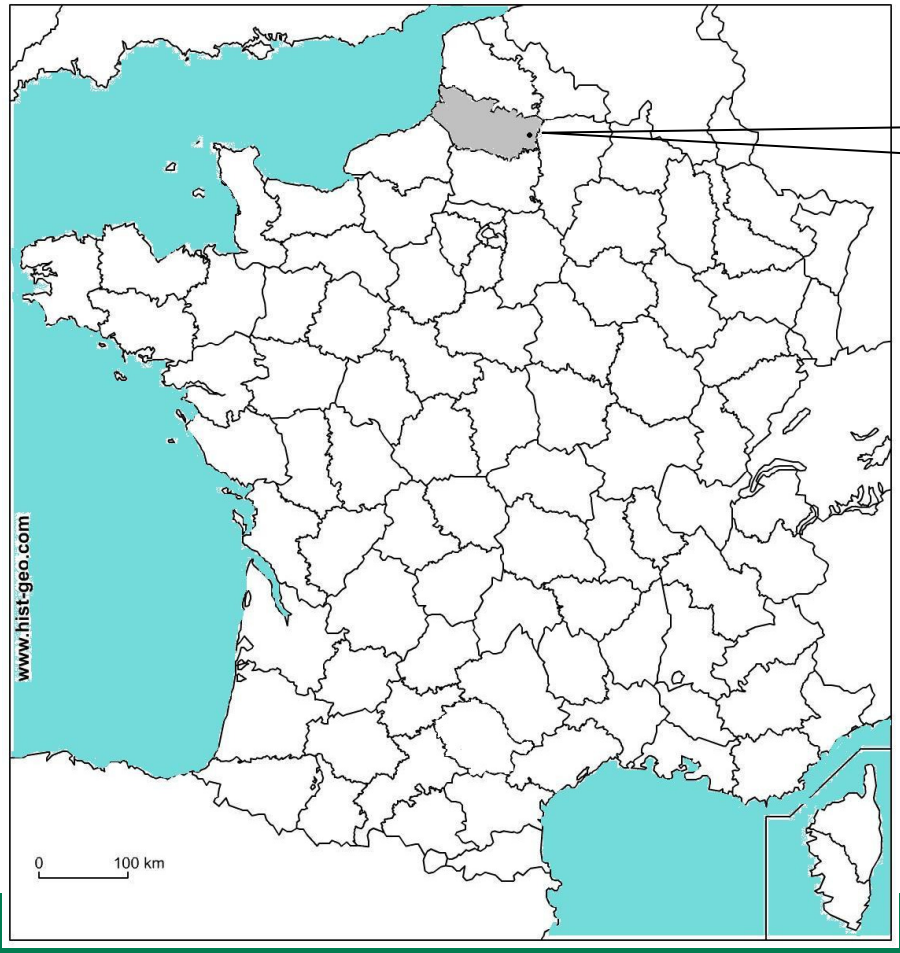
Trial location



Estrées-Mons
INRA centre

Latitude: 49°52’44’’
Longitude: 03°00’27’’

Pedo-climate

- **Climate:** Oceanic temperate
  - Mean temperatures: 10.7°C
  - Mean rainfalls: 704 mm yr^{-1}
- **Soil type:** Ortic Luvisol (FAO classification)
  - Loamy soil (18 to 24 % of clay)
  - 4 to 10 meters depth
  - Potential yield of wheat : 10 tones of grain per hectare

2. Results

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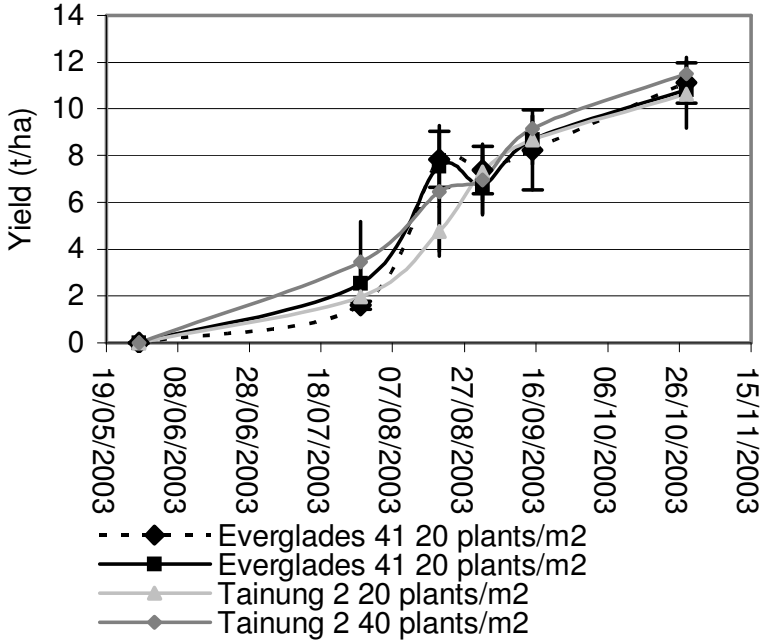
Trials and yields per year

	trial objectif	Total yield min-medium-max (t DM/ha)
2003	V*S*D	8.9-**11.0**-12.3
	I*N	7.5-**8.6**-9.2
2004	V*S*D	10.0-**10.5**-11.5
	N	8.3-**9.9**-11.2
2005	V	6.9-**11.0**-13.1
2006	N	8.5-**9.2**-10.5

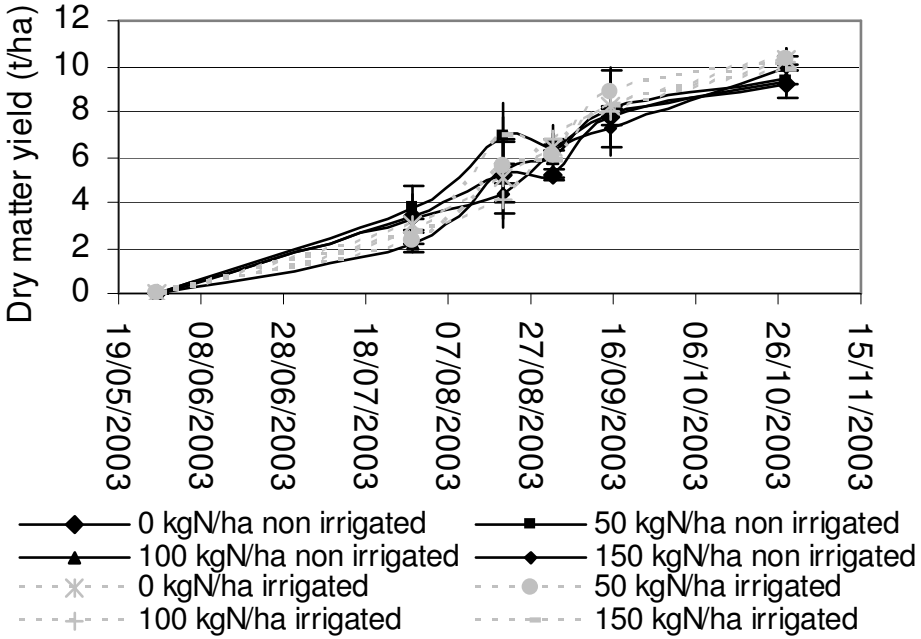
- **No statistical effect**
- **Statistical effect**

2003

Dry matter yield depending on variety and sowing density



Dry matter yield depending on N-fertilization and irrigation



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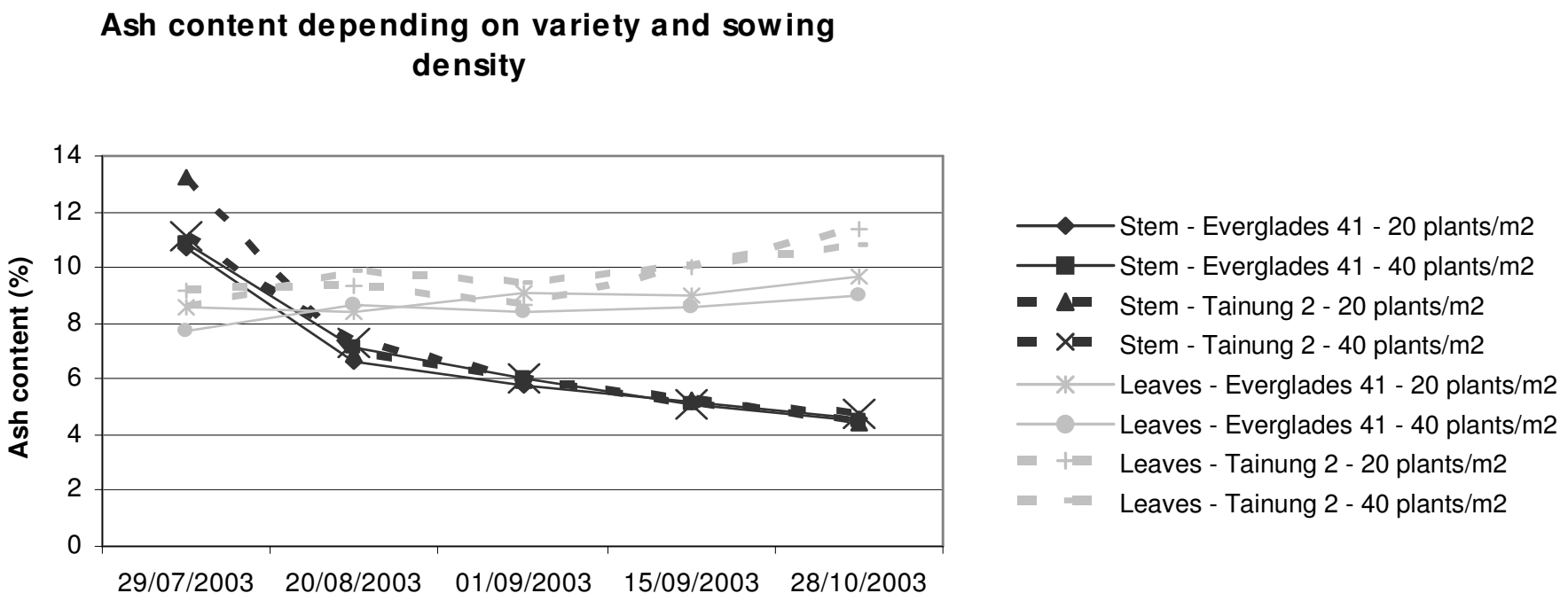
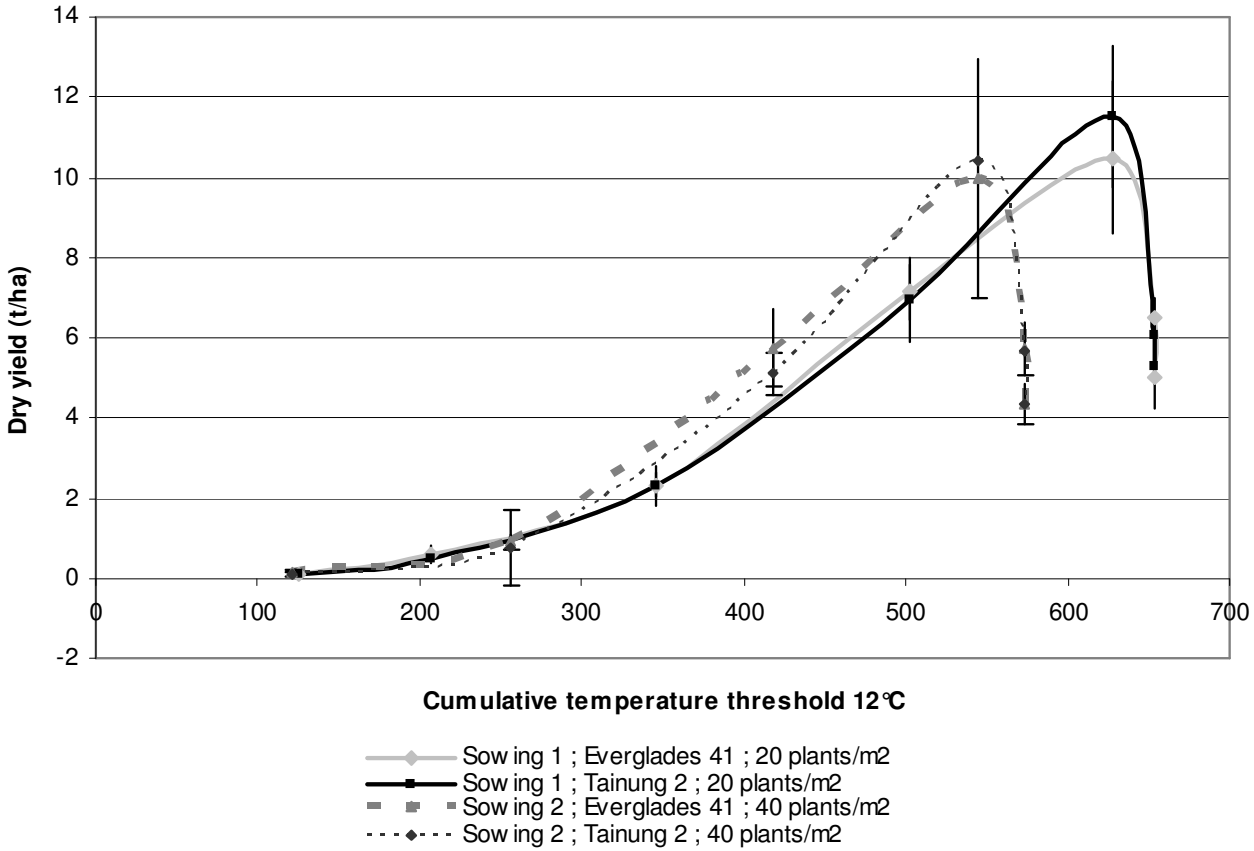
2003

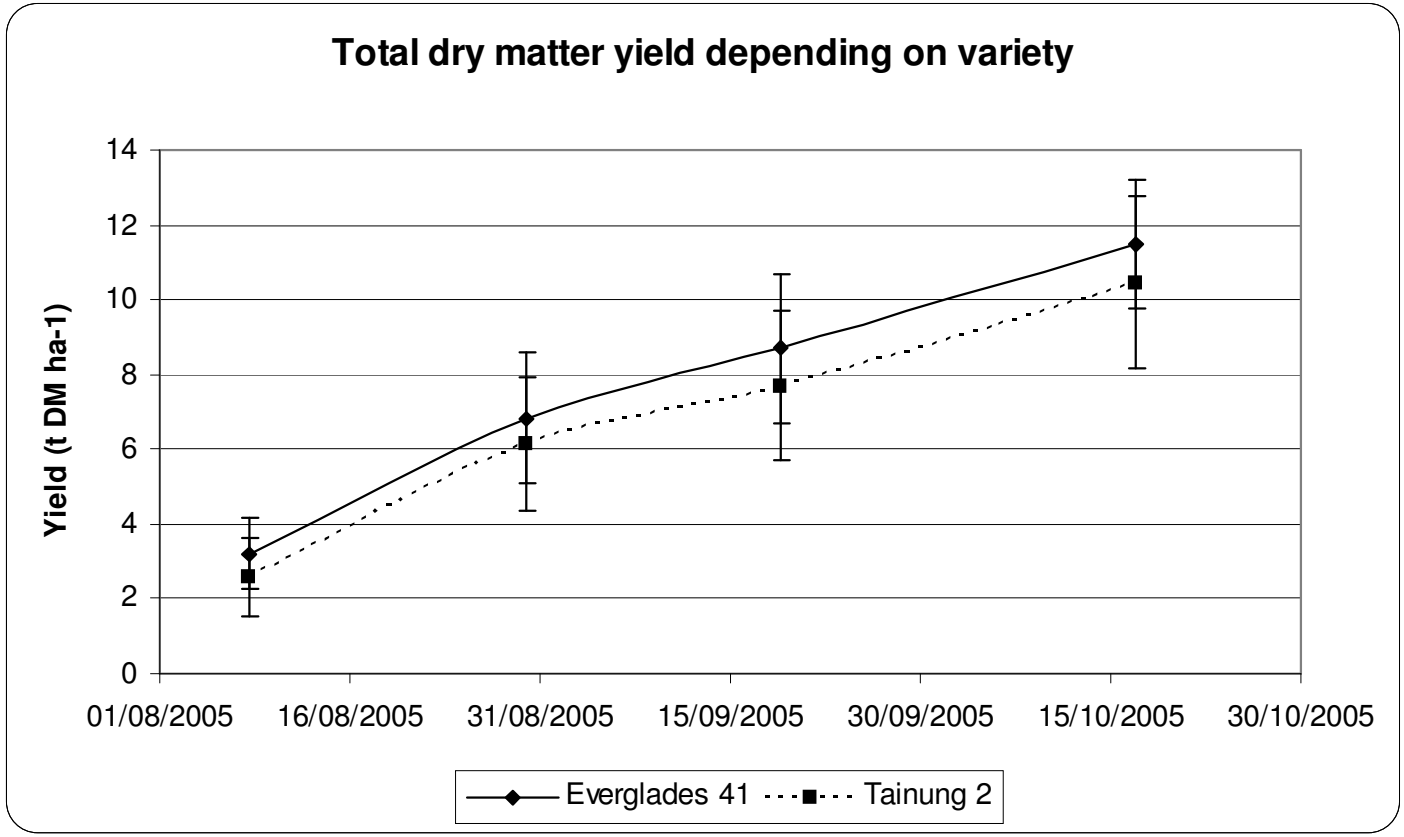

Ash content depending on variety and sowing density
Ash content (%)
14
12
10
8
6
4
2
0
29/07/2003
20/08/2003
01/09/2003
15/09/2003
28/10/2003
Stem - Everglades 41 - 20 plants/m2
Stem - Everglades 41 - 40 plants/m2
Stem - Tainung 2 - 20 plants/m2
Stem - Tainung 2 - 40 plants/m2
Leaves - Everglades 41 - 20 plants/m2
Leaves - Everglades 41 - 40 plants/m2
Leaves - Tainung 2 - 20 plants/m2
Leaves - Tainung 2 - 40 plants/m2

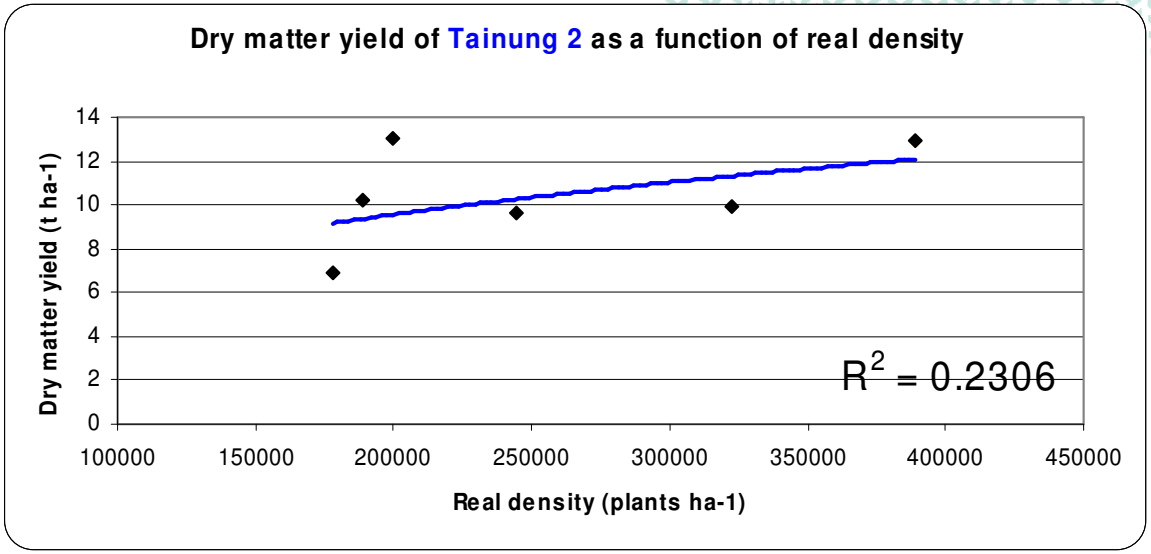
2004

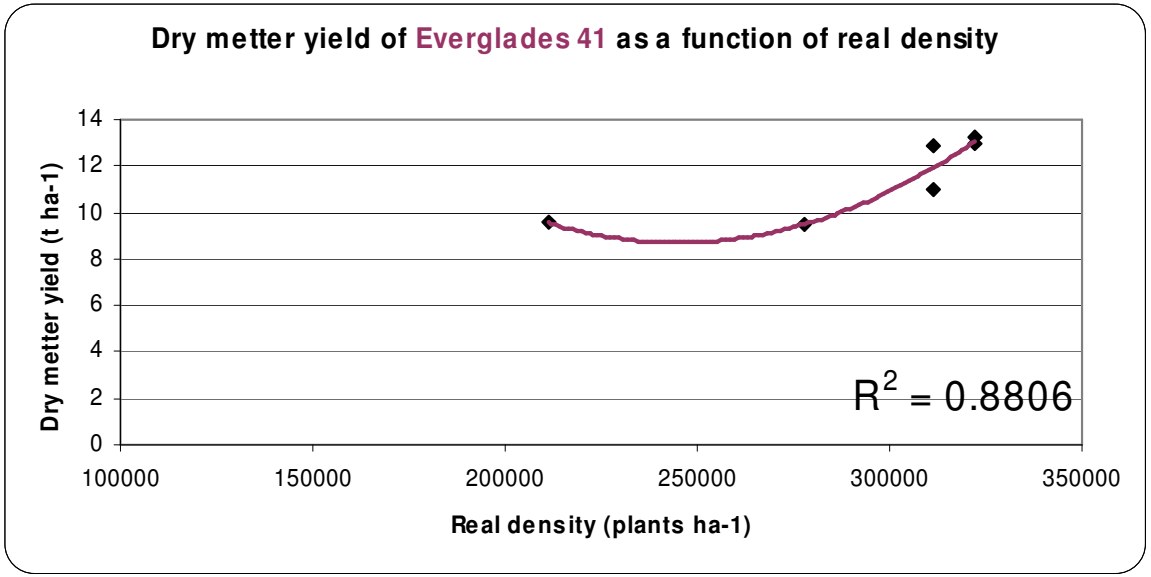
Dry matter yield depending on variety and sowing density



2005


Total dry matter yield depending on variety
Yield (t DM ha-1)
14
12
10
8
6
4
2
0
01/08/2005
16/08/2005
31/08/2005
15/09/2005
30/09/2005
15/10/2005
30/10/2005
Everglades 41
Tainung 2



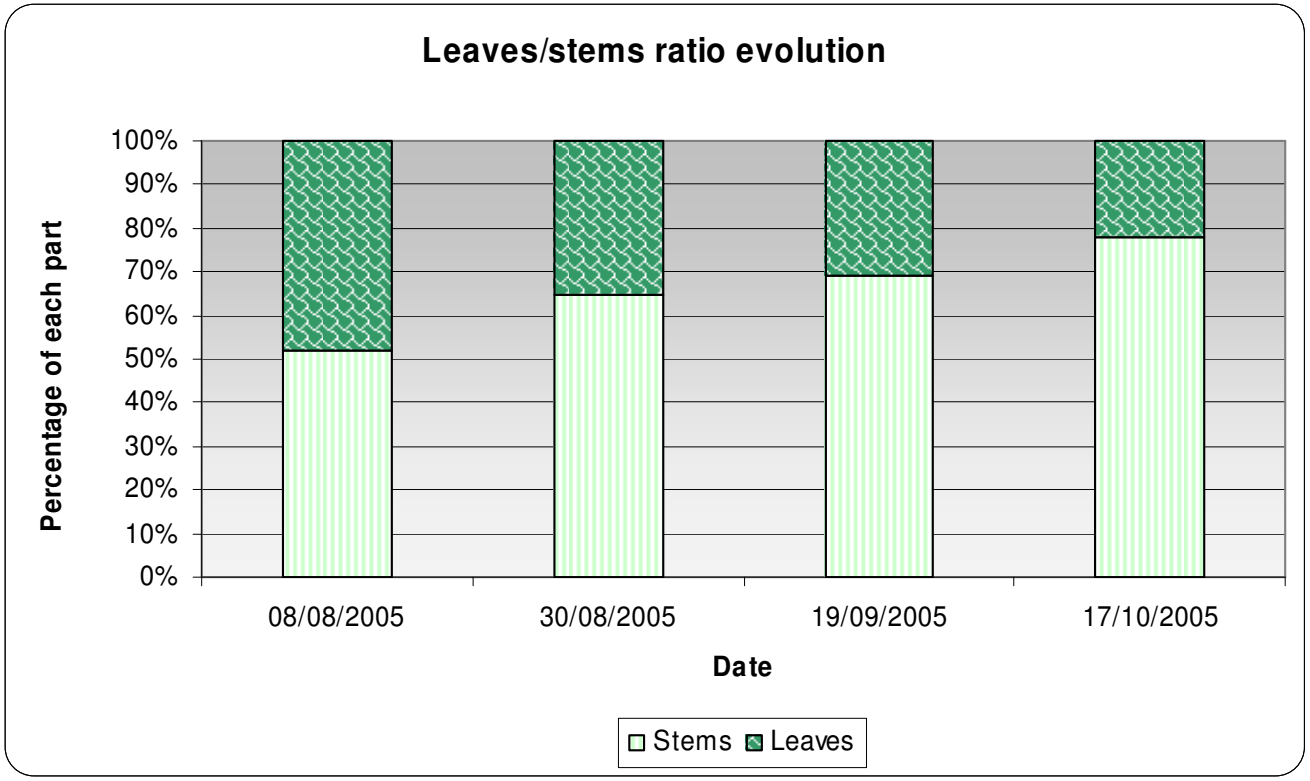


-No correlation for T2

-Positive correlation for E41

30pl/m²: limiting density is not reached

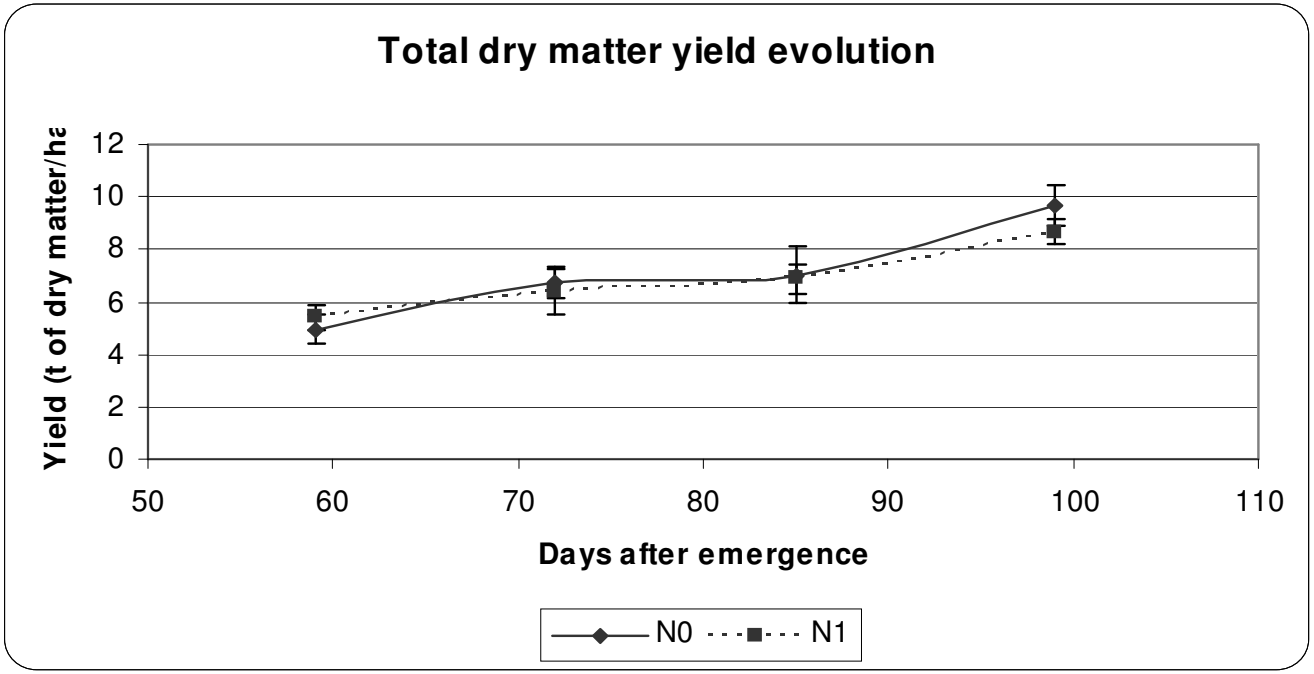
Leaf/stem ratio evolution



-Same trend for E41 and T2

-Total yield mainly explained by stems

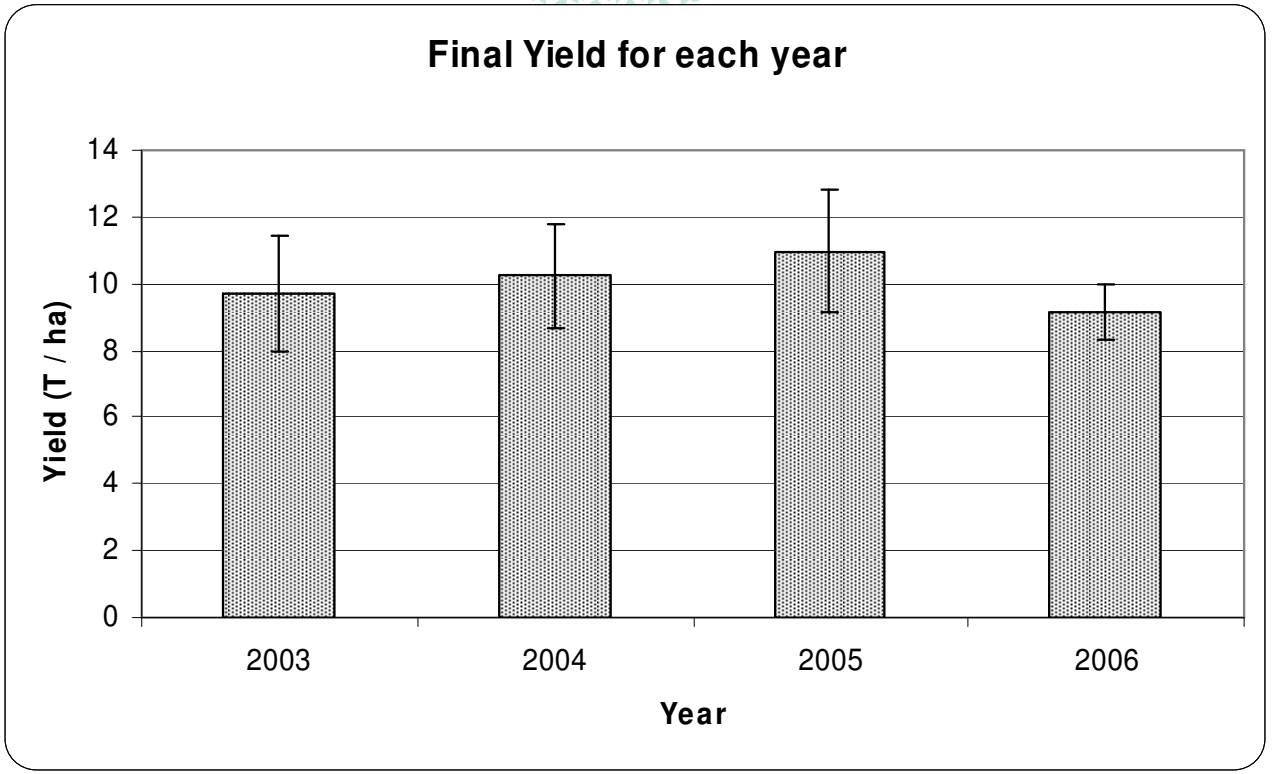
2006



No statistical difference between N0 and N1

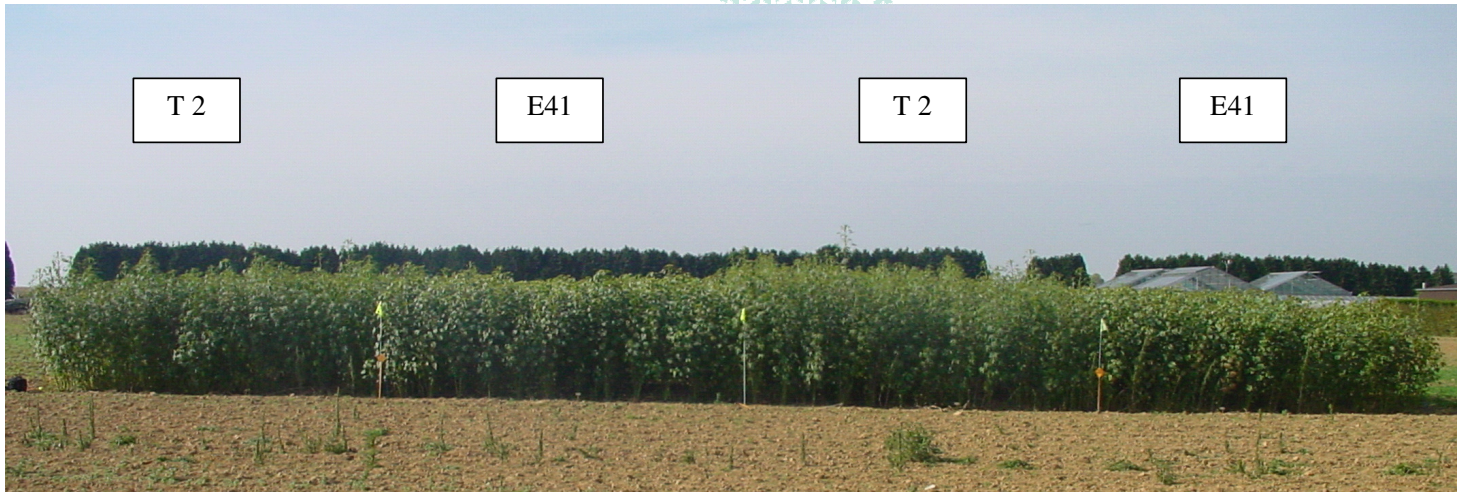
So the Initial soil N content (100 kg/ha) was sufficient for the crop

Yield comparison over years

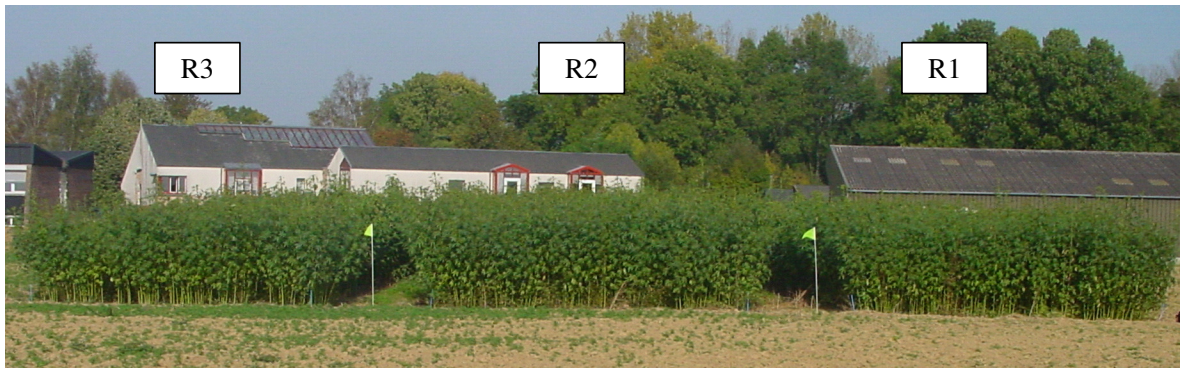


In northern France, Kenaf yield vary from 8 to 12 tones of dry matter per hectare

2005 trial



1.5 m



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In September 2005,
attack of **Gray Mold**
(Botrytis cinerea)
30% of Tainung 2

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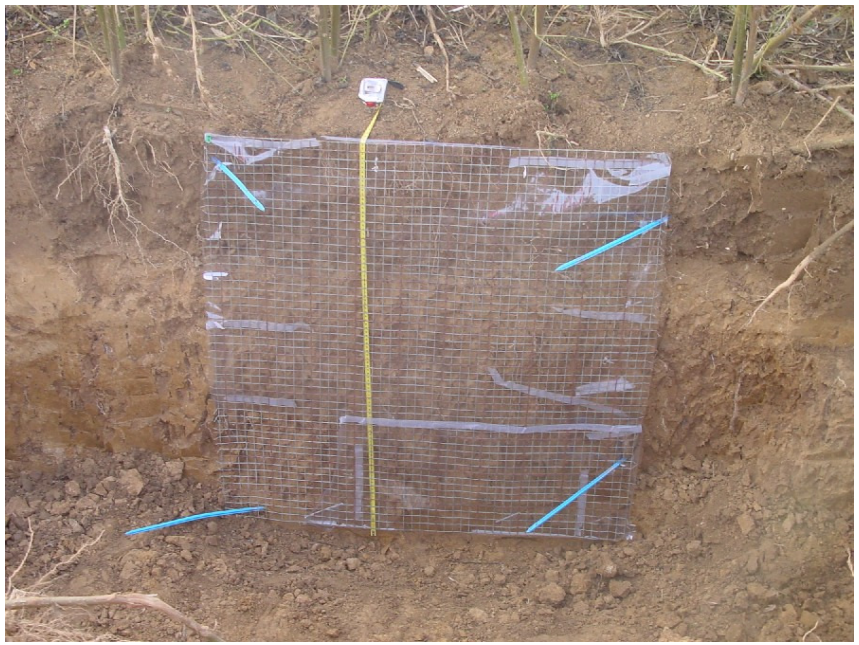
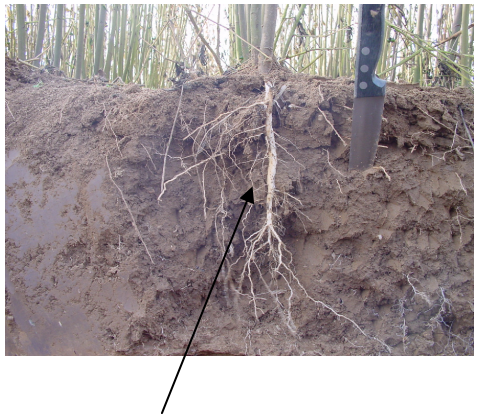
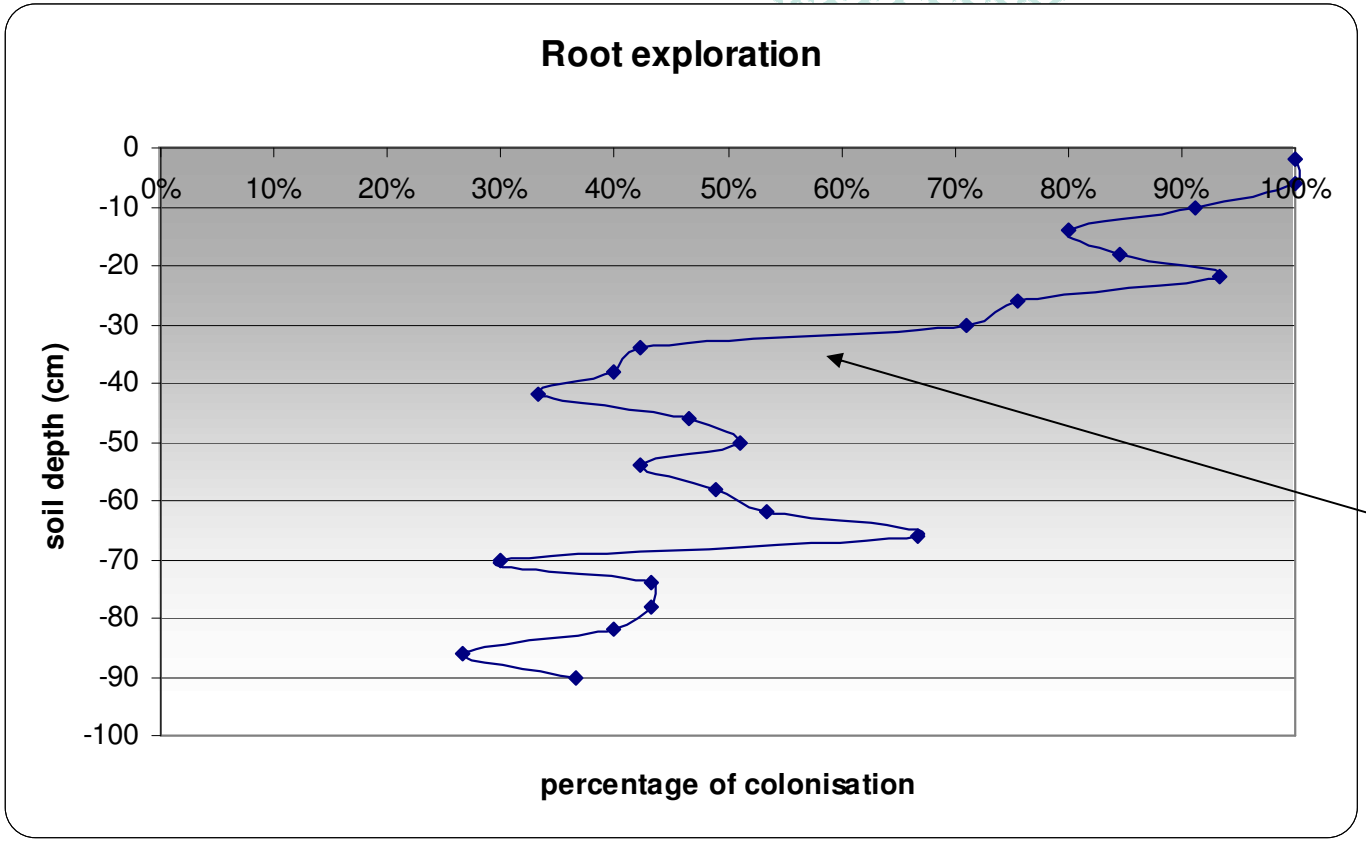
Kenaf root profile

Method: presence of roots noticed by using a grid of 1m² with squares of 2cm*2cm: root present or not





Taproot of the kenaf



Plow-pan effect

Conclusions of the root exploration

- Roots sensitive to plow-pan and maybe to other structural accidents or compactions
- Deep exploration that reaches more than 1 meter
- Maybe explain that in France, for a yield of 10t per hectare, we have few response to irrigation and fertilisation

3. Conclusions

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Task 2.2.

- **Variety**: there are few differences between varieties (T2, E41 and G4). G4 should be more adapted.
- **Sowing date**: there are no clear conclusions. A compromise must be found: not too early (low soil temperatures and high weed competition) and not too late (low soil moisture and too short growth cycle). The middle of May seems to be the best.
- **Sowing density**: there are few effects of density on the yield. So it can be a compromise between a higher cost and a faster development.

Task 2.3.

- **Irrigation:** the effect is not obvious probably because of the high soil water content. In northern France we should recommend no irrigation.
- **Nitrogen:** there is no response to the fertilisation. The soil nitrogen supply seems sufficient to achieve yields of about 10t/ha.

General conclusion

- In Northern France, the limiting factors are not water and nitrogen but temperatures and intercepted radiations
- The sustainable yield is about 10t/ha
- Some critical points:
  - Weed competition: some agronomic solutions
  - Fungal attacks: no solutions ?
  - Losses at emergence: few agronomic solutions ?