Last updated: **20th September 2002**

KENAF

Family: *Malvaceae*

Genus: *Hibiscus*

Species: *cannabinus*

Source: http://www.thepack.co.jp/hp01/ecology2.html

Contents

General Background

This is a woody to herbaceous annual low-cost natural fibre with a deep penetrating taproot, thought to be native to India. It is mostly unbranched and rapidly reaches maturity, in only 4-5 months the plants can grow to 2-5metres tall. Leaves are individually stalked and lobed to some degree. Flowers are yellow or white with a red centre and can be up to 10cm in diameter. Fruits are fleshy; producing seed capsules 1cm long containing many seeds. Seeds are brown and wedge shaped, 5mm long with a 1000-grain weight of 25g. To date none of the varieties grown in Europe have produced seed.

Kenaf is cultivated in parts of Southern Italy as a break crop where there is no need for irrigation. The crop is sown in April and grows over the wet or summer season for 90-160 days to flowering or maturity when it is harvested.

Kenaf is best suited to the tropics or subtropics where the mean daily temperature during the growing season is >20ºC, it is also sensitive to photoperiod. It is widely cultivated in these areas for its stem fibres, these are used for making ropes and sacks, and as animal litter. The leaves may be edible to both animals and humans where they can be used as a herb in some dishes. Kenaf is sometimes also referred to as Bimly, Bimlipatum, Jute and Deccan Hemp.

Details of Quality Characteristics

It is primarily cultivated for its fibre: the best fibres resemble and are suitable for jute fibres. Fibre strands are 1.5-3m long and are used for rope, cordage, canvas, sacking, carpet backing and fishing net [2].

Kenaf contains many potentially useful compounds for use in medicine to ease problems such as bruising, cuts and aches.

Oil produced by the plants is used for 1st class cooking oil and margarine production. Seeds yield 20% oil.

Resulting meal from oil extraction is 35% protein and fed to broilers gives similar results in terms of growth as soya feed [1]

Seed:

Seed composition [2]:

Moisture content		9.6%
Ash		6.4%
Fatty oil		20.4%
Palmatic oil	19.1%	
Oleic acid	28.0%	
Linoleic acid	44.9%	
Stearic acid	6%	
Alpha-linolenic acid	0.5%	
Nitrogenous matter		21.4%
Saccharifriable matter		15.7%
Crude fibre		12.9%
Other matter		13.9%

Current Production and Yields

Yields [1]:

The fibre content of fresh stems is 5-6%, this equates to 18-22% of the dry weight. Yield on average is 1-2 tonnes fibre/ha, rising to 3-3.5 t/ha under favourable conditions. Biomass production ranges from 12-18t/ha.

The production of Kenaf for different uses

USE	TONNAGE/HA
Fodder	37+/ha fresh leaves; up to 32% DM protein
Paper making Fibre	15-20 t/ha (dry)

Source: Machè (no date)

Production of the crop is gradually increasing throughout the world, the world figures for the past three years can be seen below [3].

World production of Kenaf

YEAR	AREA HARVESTED (HA)	PRODUCTION (MT)
1999	1,362,317	2,593,123
2000	1,391,036	2,651,030
2001	1,401,550	2,668,832

Source: http://apps.fao.org/

Seed production can be difficult due to ripening being gradual and the seeds tend to shatter before harvest, this can cause vast yield losses of up to 50%.

Constraints upon Production

Kenaf is very adaptable and will thrive on widely varying soil types and in a wide climatic range although the crop is frost tender, production is therefore limited to warm temperate zones through to the equator and not encouraged north of southern Europe. Optimum temperatures for growth are 15-27ºC although mean daily temperatures above 20ºC are favourable throughout the growing season. A productive population of 50plants/m^2 should be established by sowing in late spring. Although the crop is relatively drought tolerant production can be limited by both water shortage and waterlogging.

Markets and Market Potential

- Oil/chemical absorbents
- Bedding material for animals
- Insulation panelling
- Ropes, sacks, canvas, cordage
- Paper (bast fibres and cellulose)
- Soil-less potting mixes
- Grass and flower mats
- Thermochemical processes e.g. combustion, gasification, pyrolysis (core material) [3]

Its secondary use is for its seeds that can be used in salads, for cooking (flour) and lubrication, soap manufacture, linoleum, paints and varnishes.

The paper produced by the crop is the first tree-free newsprint paper available and is superior to that currently produced by pine trees [1].

Other Information

Seed is broadcast or drilled to a row spacing of 20-30cm with 5-10cm between rows. For high yields adequate fertilisation is necessary, particularly nitrogen – 60-100kgN/ha is recommended.

Kenaf is harvested at the beginning of flowering, either by hand or mechanically. The fibre content does not increase significantly after this time and it is easily separated from the wood by mechanical means. Fibres should be dried and later retted.

Kenaf is relatively free from damaging pests and diseases, at present only one pesticide and two herbicides exist for control within the crop. However, susceptibility to a wide range of diseases is visible [1], in particular *Colletotrichum hibisci* (anthracnose) and nematodes (*Meloidogyne* spp.). Later in the plants cycle they become more susceptible to *Botrytis cinerea.* Kenaf is host to several insect pests including Pink bollworm, Spiny bollworm and Cotton aphid , although none are known to cause severe damage and yield loss. Pest tolerant varieties and crop rotation are the most economic and effective methods of controlling such pests and diseases at present.

Research

Research has been carried out on Kenaf over recent years to observe the effects of irrigation, pests and diseases, planting densities and patterns, sowing/harvest time, nitrogen applications and variety on overall yields and quality of the crop. More recent studies involve looking at the land, a comparison is currently being made between crops grown in upland areas and crops grown in paddy situations in Japan, it is currently believed that Kenaf is better suited to upland areas. Research is presently being undertaken into the potential of Kenaf for the pulping industry.

Useful Websites

http://apps.fao.org/ - Database providing yield and production data
http://www.biomatnet.org/ - General information and background on many plants
http://www.nf-2000.org/index.html - General information can be gathered on a wide range of plants

BioMat Net

Kenaf (Hibiscus cannabinus)

AIR-CT92-0496 – KENAF: An Agricultural Crop for Industrial Uses

FAIR-CT96-1697 – Validation of Raw Materials Coming From KENAF (Hibiscus cannabinus)

National Activities – Italy – ITABIA Annual Report

Crops for Industry and Energy in Europe

Contacts

References

Growing Kenaf

1. Article written by Rainer Maché, (no date)

2. **Duke, J.A. and duCellier, J.L.** (1993). *CRC Handbook of Alternative Cash Crops.* CRC Press: USA

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