

## Sisal (*Agave sisalana* Perr.)

French: Agave sisal; Spanish: Agave sisal; Italian: Canapa di sisal; German: Sisal-Agave

### Crop data

A monocarpic perennial yielding 220-250 linear, lanceolate leaves with a terminal spine in the 6-9 years before it "poles" (flowers) and dies. The leaves are fleshy and contain parallel fibres. The tall inflorescence carries numerous bulbils after the flowers wither. Propagation either by bulbils or by suckers.

Hybrids, some outyielding and having a shorter production cycle than *A. sisalana*, were obtained in Tanzania as early as 1937 by crossing *A. amaniensis* ("blue sisal") with *A. angustifolia* and back-crossing the F1 with *A. amaniensis*.

Cutting usually starts after 2 1/2 years when the plant has about 100 leaves. At least 20-25 leaves should be left after each harvesting. Removal of suckers once a year is usually sufficient.

Plant density: up to 5 000 plants/ha (limit imposed by practical considerations although fibre yield positively correlated with plant population up to 10 000/ha). A double-row system is also used with bands of N-fixing cover crops (*Pueraria phaseoloides*, *Dolichos argenteus*, *Centrosema pubescens*, *Calopogonium mucunoides*, *Glycine javanica*, *Stizolobium aterrimum*) providing a dense foliage which inhibits weed growth.

The crop is indigenous to Central America but is grown in several other regions, doing best between latitudes 10 ° N and S.

Average yields (kg/ha): Africa 697, Central America 516, S. America 673, Asia 1081 (FAO 1989). Field experiments in Kenya have shown, however, that well-managed sisal can yield 3.7 t/ha of fibre per year during a 74-month cycle, or for a hybrid 6.8 t/ha per year during a 110-month cycle (planting to poling).

### Nutrient demand/uptake/removal

Nutrient removal - Macronutrients - Average content of 1 t sisal leaves (kg)							
Moisture	Dry matter	N	P2O5	K2O	MgO	CaO	S
820	180	1.0	2.66	1.97	1.66	3.78	0.27

Note: The 180 kg dry matter comprises fibre 50 kg, pulp 130 kg.

Nutrient removal - Micronutrient - Average content of 1 t sisal leaves (g)				
B	Cu	Fe	Mn	Zn
1.50	0.08	0.45	1.50	0.65

Note: The 180 kg dry matter comprises fibre 50 kg, pulp 130 kg.

Nutrient removal can be substantially reduced by returning the sisal waste to the soil. Compost made from the bulky material obtained in the decorticating factory contains, per metric ton: 6 kg N, 1 kg P, 0.8 kg K, 1.6 kg Mg, 25 kg Ca, 2.5 kg S.

### Foliar analysis

Leaf analysis data - Macronutrients - Satisfactory contents of freshly matured leaves					
% of dry matter					
N	P	K	Mg	Ca	S
2.4	0.18	2.5	0.40	0.8	0.10

**Leaf analysis data - Micronutrients - Satisfactory contents of freshly matured leaves**

ppm dry matter						
B	Cu	Fe	Mn	Mo	Zn	Co
12	6	100	40	0.2	23	0.5

## Fertilizer recommendations

Soil pH should be adjusted to 5.5-6.5 by liming (preferably using dolomitic limestone to supply Mg) before transplanting. Mottled-leaf symptoms and "bole-rot" stem disease occur more frequently in soils low in Ca.

Fertilizers are normally applied in bands alongside the rows; deep placement is unnecessary (except for transplants) as the root system of sisal is very shallow. The width of the bands is increased as the plants grow older.

### Micronutrients

Boron deficiency may be avoided by including 0.5-1.0 kg/ha B in the fertilizer application.

Deficiencies of other micronutrients may be avoided or corrected by means of foliar sprays.

## Present fertilizer practices

Recommendations for S. Brazil

after the first cutting 50 kg/ha N are sidedressed. P and K are applied according to soil P and K analysis:

Soil P - $\mu\text{g}/\text{cm}^3$	meq soil K/100 cm <sup>3</sup>			
	< 0.07	0.08-0.15	0.16-0.30	> 0.30
	kg/ha N - P <sub>2</sub> O <sub>5</sub> - K <sub>2</sub> O			
< 6	0-60-70	0-60-60	0-60-50	0-60-15
7 - 15	0-50-70	0-50-60	0-50-50	0-50-15
16-40	0-30-70	0-30-60	0-30-50	0-30-15
>40	0- 0-70	0- 0-60	0- 0-50	0- 0-15

Soil P and K; resin extraction - \* N, see recommendation above (50kg/ha)

### Recommendations for N.E.Brazil

P and K according to soil analysis.

First year:

Nutrient	Furrow for transplanting	Sidedressing
	kg/ha	
Nitrogen (N)	20	40
Phosphorus (P <sub>2</sub> O <sub>5</sub> ) - ppm soil P		
< 6	70	-

7-13	50	-
14-20	30	-
Potassium (K <sub>2</sub> O) - ppm soil K		
< 30	35	35
31-60	25	25
61-90	15	15
Soil P and K, Mehlich extraction		

Maintenance fertilization after first cutting (kg/ha/year):

N = 40;

P<sub>2</sub>O<sub>5</sub> = 0 to 70 (according to soil analysis);

K<sub>2</sub>O = 30 to 70 (according to soil analysis);

Total rates split into 2 applications, one of them after cutting.

### **Recommendations for Africa**

For maintenance, usually 50-100 kg/ha N, 0-120 kg/ha P<sub>2</sub>O<sub>5</sub> and 30-60 kg/ha K<sub>2</sub>O per year in two equal dressings, the lower rates being applicable to soils high in organic matter, P and K.

### **Further reading**

SALGADO, A.L.B. et al: Efeito de omissao de macronutrientes em sisal. *Bragantia* (Campinas), 41 (13), p.125-134 (1982)

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*Author: E. Malavolta, Professor of Plant Nutrition, Universidade de Sao Paulo, Piracicaba, Brazil*