

VETIVER SYSTEM

VETIVER GRASS THE PLANT



VETIVER GRASS - THE PLANT

THE VETIVER GRASS SPECIAL CHARACTERISTICS

Vetiver Grass, a long living perennial grass, grows under extreme and wide ranges of conditions:

- **Temperatures: -12 ° C to >55° C**
- **Soil pH from <3 to >10**
- **Annual Rainfall <300 mm to > 5,000 mm**
- **Tolerant to all heavy metals**
- **Saline tolerant**
- **Fire tolerant**
- **Few Pests and diseases**
- **Powerful (75 Mpa root strength) and deep root system**
- **Non competitive and non invasive**



Nutritional values of Vetiver, Rhodes & Kikuyu grass in Australia

Analytes	Units	Vetiver grass	Vetiver grass	Vetiver grass	Rhodes	Kikuyu
		<i>Young</i>	<i>Mature</i>	<i>Old</i>	<i>Mature</i>	<i>Mature</i>
Energy (Ruminant)	kCal/kg	522	706	969	563	391
Digestibility	%	51	50	-	44	47
Protein	%	13.1	7.93	6.66	9.89	17.9
Fat	%	3.05	1.30	1.40	1.11	2.56
Calcium	%	0.33	0.24	0.31	0.35	0.33
Magnesium	%	0.19	0.13	0.16	0.13	0.19
Sodium	%	0.12	0.16	0.14	0.16	0.11
Potassium	%	1.51	1.36	1.48	1.61	2.84
Phosphorus	%	0.12	0.06	0.10	0.11	0.43
Iron	mg/kg	186	99	81.40	110	109
Copper	mg/kg	16.5	4.0	10.90	7.23	4.51
Manganese	mg/kg	637	532	348	326	52.4
Zinc	mg/kg	26.5	17.5	27.80	40.3	34.1



Threshold levels of heavy metals to vetiver growth as compared with other species

Heavy Metals	Threshold levels in soil (mgKg ⁻¹)		Threshold levels in plant (mgKg ⁻¹)	
	Vetiver	Other plants	Vetiver	Other plants
Arsenic	100-250	2.0	21-72	1-10
Cadmium	20-60	1.5	45-48	5-20
Copper	50-10	Not available	13-15	15
Chromium	200-600	Not available	5-18	0.02-0.20
Lead	>1 500	Not available	>78	Not available
Mercury	> 6	Not available	>0.12	Not available
Nickel	100	7-10	347	10-30
Selenium	>74	2-14	>11	Not available
Zinc	>750	Not available	880	Not available



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Clump of Vetiver Grass on a coffee farm in Costa Rica (Rainfall more than 1,000 mm). The plant can grow as tall as 2m.



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A clump of vetiver grass in southern California (less than 300 mm rainfall). This plant has never received supplementary watering, compare with adjacent native plant. It will survive fire and grazing.



VETIVER GRASS - THE PLANT

This vetiver grass root system is from southern China and is two years old - Very dense, often grows to 5 meters deep, generally vertically, av. tensile strength 75 Mpa. The roots are able to penetrate weathering rock, hard pans, and other hostile growing media.

Soil organism, such as mycorhyza are area associated with the root system and as a result the plant is able to make use of soil nutrients that are often unavailable to other plants.



VETIVER GRASS - THE PLANT

This image shows the uniqueness of vetiver's propagation ability. When soil builds up behind a vetiver grass plant new roots grow from nodes on the culm. Thus vetiver can never be "drowned" in soil or mud. This characteristic accounts for its ability to create terraces on the up slope behind the vetiver



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Vetiver grass is planted (Burkina Faso) on the contour in the form of slips. Each slip is planted 10-15 cm apart. Best time of planting is normally just before the rainy season.



VETIVER GRASS - THE PLANT

The young plants grow up into a thick and continuous hedge. This hedge in Zambia was planted on a research station (1200 mm rainfall) in 1926. In 1986 it was still there



VETIVER GRASS - THE PLANT

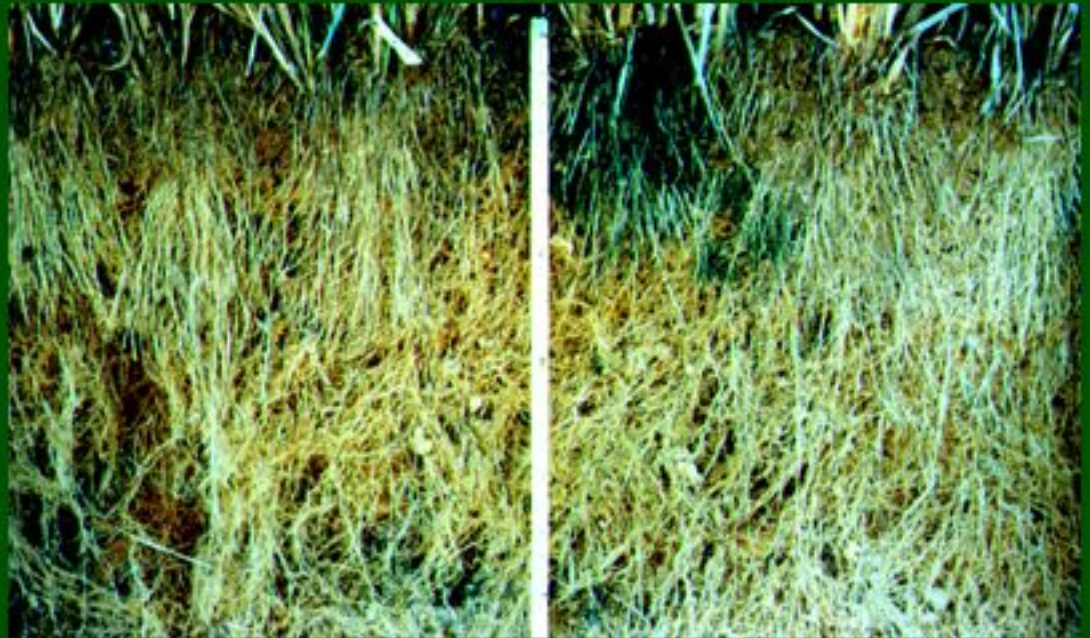
This classic photo from Malaysia (rainfall 2,500 mm) shows the cross section of a two year old vetiver hedgerow on a 5% slope.

The original head line was planted along the line of the white stake. The original topsoil layer is the dark band. 30 cm of soil has built up behind the hedge to create a terrace, the hedge has grown with the terrace



VETIVER GRASS - THE PLANT

This image from Malaysia shows a longitudinal section through a vetiver hedgerow. The roots are so dense that they create a curtain of roots. This together with its high tensile root strength is the reason why vetiver will stabilize very steep slopes and prevent slippage



VETIVER GRASS - THE PLANT

Vetiver will grow on a wide range of soil types. In this image from China it is growing on the side of a rocky road. Vetiver will tolerate soil pH from 3.0 to 11.0. It will also tolerate heavy metals



VETIVER GRASS - THE PLANT



Vetiver grass will survive complete submergence by water for four or five months. It can therefore be used for river bank stabilization and flood control purposes. In this image vetiver protecting a small farm in Bangladesh is flooded by river water



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Additional Reading (linked to TVNI website):

[Vetiver Grass - The Plant - photo album](#)

[Vetiver System - A Green Investment for Sustainable Development](#)

[Look See at Vetiver in Malaysia](#)

[Know your hedge - Environmental Concerns about Vetiver](#)

