

COMPARATIVE STUDY OF VETIVER (*Vetiveria zizanioides*) AND ANOTHER PLANTS USED ALS HEDGEROWS IN THE SOIL CONSERVATION ON STEEPS LAND

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ABSTRACT

Support of soil productivity and use efficient of water to demand conservation practices, being the agronomics on the part of farmers more easily adopted (Roose, 1993).

A hedgerow is a plants row, perennial or semi-perennials, with dense growth since of soil, sowed perpendicular to slope or in contours in order to reduce runoffs speed and to cause the sedimentation (Suárez, 1979). The same constitute an agronomic soil conservation practice applicable in lands arable or not and diverse agricultural systems. Hedgerows are very efficient and easily transferable in tropical countries, due to its low cost, simplicity in the design and maintenance (Rodríguez, 1993). However, the selection of appropriate vegetative materials or plants is a previous step to succeed at implementing this practice, and diversity of alternatives favourable to farmer will enhance adoption of this technology.

Purpose of this research was to validate a simple and economic alternative, easily adopted for the producer. Validation was done through determination of efficiency and aptitude of different vegetative materials used as hedgerows in the protection of a soil on steep land cultivated.

In order to determine and compare the efficiency of different hedgerows as soil conservation system on steeps lands cultivated, and to assess potential of different vegetative materials to be used as hedgerows for soil conservation, a field study was conducted under natural rainfall conditions in the Bajo Seco Experimental Station, located above 1800 m elevation, within the Basin of Petaquire River in the North Central Region of Venezuela. The zone present annual ranges of precipitation and temperature around 860 mm and 15° C, respectively and soils characterized as *Aquic paleodult* from low natural fertility, moderately drained, sandy loam, subangular blocky structure and acid pH (Abreu and Ojeda, 1984).

Vegetative materials assessed included: vetiver grass (*vetiveria zizanioides*) with two planting dates, Guatemala grass (*Trixacum laxum*), fern (*Nephrolepis sp.*), african's lily (*Agaphantus africanus*), lemon grass (*Cymbopogon citratus*) and imperial grass (*Axonopus scoparius*).

Determination of efficiency was realized during September-December (1997), using field erosion plots 1 m width and 10 m length, with slopes of 15 and 20 %, cultivated with carrot (*Daucus carota*). The hedgerows were established 10 months before the test, in lower extreme of the plots, in single row with space of 10 cm between plants (single tillers). A hedgerow of vetiver grass with 10 years old was evaluated too. The experimental design was at random with 3 repetitions in 8 treatments. The efficiency of hedgerows was determined through the quantification of losses of soil, water, nutrients and organic matter, water content in the soil and crop yields, as well as, factors of the USLE (Universal Soil Losses Equation).

Potential of different vegetative materials to be used as hedgerows was realized during September- May (1998). Shoots, high and morphological development of plant, depth and distribution roots were evaluated for each vegetative material. The experimental design was a completely at random with 6 treatments and 3 repetitions.

Results show that rainfall erosivity and soil erodability were low during the evaluation period. Soil and water losses increased as slope increased. . Carrot crop offered very poor

protection against soil erosion. The most efficient hedgerow to reduce losses of soil, nutrients, organic matter and water and to keep higher water contents in the soil was vetiver grass 10 years-old. Higher yields were obtained one meter above the hedgerows with a trend to be lower at the upper side of the erosion plots.

In relation a potential, the grasses have the best to establish an efficient hedgerows in a short period, due to their higher growth speed and better morphological and root development, specially Guatemala and vetiver grasses when a short planting space is applied.

Key words: control soil erosion, hedgerows, steep land crops, USLE, Guatemala grass, Fern, African Lily, Lemon grass, Imperial grass