



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



**CARIBBEAN
FOOD
CROPS SOCIETY**

22

**Twenty Second
Annual Meeting 1986**

St. Lucia

Vol. XXII

RESEARCH ON IMPROVED PASTURES IN ST. CROIX, U.S. VIRGIN ISLANDS

Michael Michaud

Agricultural Experiment Station
College of the Virgin Islands
RR 2, Box 10051
Kingshill, St. Croix 00850

ABSTRACT

Seeding with improved forages is necessary if land dominated by hurricane grass (*Bothriochloa pertusa*) is to become productive. Varieties of grasses and legumes adapted to St. Croix have been identified and are being recommended for planting. Though use of equipment designed specifically for sowing pastures would be ideal, their scarcity in St. Croix and high purchase price make their consideration impractical. Consequently, alternative low cost methods for planting have been devised. In addition, the concept of Pure Live Seed is being promoted to ensure adequate seeding rates while planting strategies designed to reduce losses from water shortages are being recommended.

INTRODUCTION

Pastures in St. Croix, U.S. Virgin Islands, are normally dominated by a high producing, naturalized variety of guinea grass (*Panicum maximum*). These native pastures also contain relative large proportions of both herbaceous and woody legumes (Michaud and Michaud, 1986), and can, when properly managed, satisfy much of the nutritional requirements of the island's ruminant livestock.

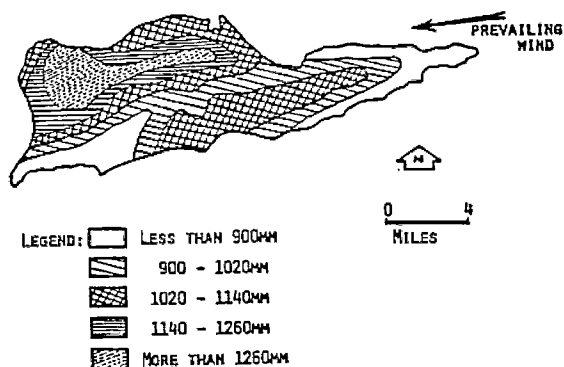
Frequently, though, they are subject to an extended regime of overgrazing which weakens the plants and causes their death and disappearance from the sward. As this occurs, hurricane grass, (*Bothriochloa pertusa*), a poor-quality, low-producing species, invades the area and gradually becomes dominant. Consequently, the carrying capacity and production potential of the pastures are reduced.

Though large areas of land have been lost to hurricane grass in this manner, they can be readily reseeded and returned to a more productive state. Forage grasses and legumes adapted to St. Croix have been identified and are being recommended for reseeding purposes. Planting strategies have also been devised for recommendation to the livestock producer. These strategies consider the environmental constraints under which planting must be done as well as the economic and technical limitations that exist in St. Croix.

RAINFALL AND SOILS OF ST. CROIX

St. Croix is a relatively dry island, with an average annual rainfall of approximately 1100 mm. However, the amount varies considerably depending on geographical location (Fig. 1). The northwest is the wettest area while the drier sections are in the east and both the southeast and southwest coastal areas.

Figure 1. Average annual rainfall in St. Croix, U.S.V.I. (Jordan, 1975)



Rainfall also varies during the course of the year as shown in the following tabulation:

<u>Month</u>	<u>Rainfall</u> (mm)
January	57
February	56
March	44
April	72
May	109
June	79
July	89
August	116
September	169
October	138
November	118
December	85
Total	1132

The wettest months are during the Autumn and early Winter, while the driest ones are January, February, and March. A peak of rainfall generally occurs in May, though this has been absent the last few years.

Soils in St. Croix are generally neutral to slightly basic. Textures of pasture lands are usually clay loams, with some sandy clay loams.

Pasture Grasses and Legumes

Grasses: Replanting pastures with improved grasses is not a new idea in St. Croix. Over 20 years ago, for example, large areas of land were sprigged with Pangola grass (*Digitaria decumbens*). It has persisted well, especially in the wetter parts of the island, and remained productive even under the minimum-input system under which it was managed.

Grasses currently recommended for planting in St. Croix do not include those, such as Pangola, which are vegetatively propagated. Though this approach may eliminate some potentially productive material, it is felt that the use of seed will greatly facilitate pasture development. For example, buying and sowing seed is much easier than cutting and planting vegetative parts. In addition, establishment failures are likely to be less from a seeded pasture if an extended drought follows planting.

Seed in sufficient quantities to satisfy the requirements for commercial plantings can be obtained from companies in Texas, U.S.A. Texas is a dry state with slightly acid to basic soils, and grasses that perform well there are adapted to St. Croix. Seed is reasonably priced and can be delivered quickly and inexpensively by means of the U.S. Postal Service. Recommended varieties are listed in the following tabulation:

<u>Name</u>	<u>Varieties</u>
Green Panic (<i>Panicum maximum</i>)	Petrie
Buffel (<i>Cenchrus ciliaris</i>)	Common, Nueces
Klein (<i>Panicum coloratum</i>)	Selection 75, Verde

Legumes: St. Croix has a number of indigenous legumes that are important constituents of the native swards. These legumes are often present in pastures planted with improved grasses and can make a significant contribution to the productivity and nutritional status of the pasture. One such example is the buffel grass pasture, shown in the following tabulation

<u>Species</u> ^{1/}	<u>Percentage</u>
<i>Cenchrus ciliaris</i>	32.8
<i>P. maximum</i> (local)	9.0
<i>B. pertusa</i>	3.0
<i>Desmanthus</i> spp.	18.9
<i>Teramnus</i> spp.	12.4
<i>Clitoria</i> spp.	3.0
<i>Rhynchosia</i> spp.	2.5
<i>Stylosanthes</i> spp.	2.5
Other	15.9

These indigenous legumes, however, are not always found to a significant degree in pastures planted with improved grasses. Consequently, seed of adapted commercial varieties should be planted to ensure the presence of

^{1/} Species composition determined by the step-point method of Evans and Love (1957).

legumes in a sward. Those that are recommended include perennial soybean (*Neonotonia wightii*) and Siratro (*Macroptilium atropurpureum*). These can be purchased from Australian seed companies.

PASTURE ESTABLISHMENT

Livestock producers in St. Croix have been seeding improved pastures for at least 10 years (Charles Schuster, personal communication). While these efforts have resulted in a number of productive swards, many attempts have not appreciably increased the population of the grass that was sown (Table 1). These failures cost time and money and can discourage a producer from further attempts at planting.

Table 1. Species composition of a pasture before and after planting with Green Panic (*Panicum maximum*).

Species	Pre-plant (%)	Post-plant (%)
P. maximum		
var. <i>trichoglume</i>	-	13.2
P. maximum	22.1	17.2
B. pertusa	52.8	13.3
D. decumbens	4.0	4.4
Legumes	16.5	14.5
Other	4.5	37.4

Reasons for these failures have been identified and include insufficient seeding rate, inappropriate time of planting and lack of planting equipment.

Insufficient seeding rate: Seed must be sown at rates high enough to give a plant population that will maximize yields. From observations of establishment efforts that had otherwise failed, it was seen that adequate stands were achieved near trees and at the edges of fields where seeding equipment had passed more than once. Consequently, inadequate seeding rates can be implicated to some extent in poor plant stands.

Insufficient quantities of seed are often planted because of variability in purity and germination from one lot to another. This variability makes it difficult to recommend a specific seeding rate to use since it may be sufficient for one lot but too low for another of lesser quality. To overcome this problem, the concept of Pure Live Seed (PLS) is being promoted. PLS reflects the germination and purity of the seed and is calculated from the following formula:

$$\% \text{ PLS} = \frac{\% \text{ Purity} \times \% \text{ Germination}}{100}$$

Currently, 2-3 kg/ha of PLS is the advised seeding rate for recommended grasses on the island. To determine the bulk seeding rate that must be planted to obtain a certain PLS rate, the following formula can be used:

$$\text{Bulk seed rate (kg/ha)} = \frac{\text{PLS rate (kg/ha)}}{\% \text{ PLS}} \times 100$$

Using this formula, the bulk seeding rate of lots varying in quality will differ significantly (Table 2).

Table 2. The effect of quality on the planting rate of two lots of Green Panic (*Panicum maximum*).

Item	Lot 1	Lot 2
Purity (%)	32	65
Germination (%)	39	52
PLS (%)	12	34
Bulk seed needed to plant 2 kg PLS/ha (Kg/ha)	16	6

Time of Planting: Time of planting strongly influences the success of pasture establishment. For example, it is recommended that pastures be planted in September or October to take advantage of the heaviest and most reliable rains. Though successful pastures have been planted at other times of the year, the chances of failure are high since moisture may be adequate for germination but insufficient for subsequent survival.

Since insect populations vary throughout the year (F. Proshold, unpublished data), planting time influences the extent of damage suffered by young seedlings and the final plant stand of the pasture. In 1985, for example, some pastures that were sown during a peak of caterpillar infestation failed to become established despite adequate rainfall. Subsequent replantings, however, were less affected by attack and resulted in productive swards.

Lack of Planting Equipment: To prepare land for reseeding, it is recommended that plowing and discing be performed. Land preparation is easily accomplished in St. Croix since plows and discs are either owned by the larger producers or readily leased by the smaller ones from the Department of Agriculture or private contractors. There is, however, very little sowing equipment for pasture establishment. One Brillion seeder is cooperatively owned by a group of farmers while one producer has a no-till planter.

The lack of proper equipment, however, has not deterred attempts at pasture planting. Instead, techniques to circumvent the equipment shortage have been devised, some of which are effective in establishing high-producing swards.

One of the more common methods has been to simply broadcast seed on land that has been plowed and disced. Though planting in this manner is simple and inexpensive, it can also be ineffective since seed on the soil surface dries out quickly following rains and washes away during storms.

To alleviate the problems associated with broadcasting, modifications designed to enhance seed-soil contact have been adopted. One farmer, for example, dragged a length of chain-link fence over land which had been broadcast planted. The fence was weighted down with pieces of wood attached perpendicularly to the direction of travel and served to lightly cover the seed. Another farmer used a discarded Brillion seeder to roll his land and press the seed into the soil.

Based on farmer experiences, cost and availability of materials, and effectiveness of technique, a current recommendation for pasture planting includes broadcasting the seed on prepared land and then dragging with a piece of chain-link fence. The fencing material is readily available from a number of businesses in St. Croix or can often be salvaged from garbage bins or dumpsites. Though a tractor can be used to drag the fence, a pick-up truck is equally effective. Seed can be spread by hand or a cyclone-type seeder used for smaller areas, while one of the various types of fertilizer spreaders can be used for larger sites.

REFERENCES

- Evans, R. and Love, R.M. 1957. The step-point method of sampling: A practical tool in range research. *J. Range Management* 10: 208-212.
- Jordan, D.G. 1975. A survey of the water resources of St. Croix, Virgin Islands.
- Michaud, P.J. and Michaud, M.W. 1986. Composition and management studies on native pastures in the U.S. Virgin Islands. *Proc. Caribbean Food Crops Soc., St. Lucia*. (In press).
- United States Department of Agriculture. 1970. Soil Survey of the Virgin Islands of the United States. U.S. Government Printing Office, Washington, D.C.