



Western SARE Program

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NITROGEN-FIXING HEDGEROWS

Situation

Intercrop-
ping with
hedgerows, one
of the recom-
mended farm-
ing systems in
the Pacific, can
enhance pro-
ductivity of
limited farm-
lands by provid-
ing:

- Nutrient cycling from deeper soil layers
 - Green manuring and mulching benefits
 - Weed suppression and barriers from pests and diseases
 - Erosion control
 - Biologically fixed nitrogen in farming systems
 - Animal feeds and lumber
2. Examine biomass production of the plants grown in different soils on Guam
 3. Examine seed production in different soils
 4. Examine the plants' susceptibility to arthropod, nematode and disease problems
 5. Produce videos, fact sheets and technical

After the USDA Natural Resources Conservation Service introduced selected species of hedgerow plants to the Marianas, several farmers expressed an interest in planting hedgerows on their farms. However, lack of site-specific information on hedgerow management and species adaptability to local soils hindered adoption.

Objectives

1. Develop protocols for seed propagation of leguminous plants as hedgerows and develop a guidebook



Biomass from nitrogen-fixing trees is weighed.



Workers assess the canopy of *Gliricidia sepium*

reports on plant production and present results at workshops and conferences

Actions

Seeds of eight nitrogen-fixing leguminous plants were obtained locally or from a seed company in Hawaii, and three-month-old seedlings were planted in a randomized complete block design with three replications at three experiment stations on Guam:

- Yigo Farm, northern Guam, soil type Guam cobbly clay loam, 6.4 to 7.5 pH
- Barrigada Farm, central Guam, soil type Pulantat clay, 6.0 to 7.5 pH
- Ija Farm, southern Guam,

Research and Education Grant

Project Number: SW/99-048

Project Title: Evaluation and Implementation of Nitrogen-Fixing Species in Hedgerow Intercropping In the Marianas

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Western SARE, a USDA organization, funds grants for research and education that develop or promote some aspect of agricultural sustainability, which embraces

- *profitable farms and ranches*
- *a healthy environment*
- *strong families and communities.*

The Western Region, one of four SARE regions nationwide, is administered through Utah State University.

Western SARE:
<http://wsare.usu.edu>

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soil type Akina silty clay, 4.5 to 6.2 pH

Biomass, flowering, seed production and occurrence of arthropods, diseases and nematodes were examined for each of these species:

1. *Leucaena leucocephala* cv. K636
2. *Sesbania sesban* cv. Nubica
3. *Gliricidia sepium*
4. *Desmodium rensonii*
5. *Cajanus cajan*
6. *Acacia angustissima*
7. *Flemingia macrophylla*
8. *Calliandra calothyrsus*



Results

Propagation

A brochure describing the propagation methods for each species was produced.

Biomass Production

L. leucocephala cv.K636 produced the greatest biomass in the trial, with 26.1 tons per hectare at Barrigada, followed by *S. sesban* cv. Nubica at 19.9 tons per hectare, also at Barrigada. Except for *F. macrophylla* and *C. calothyrsus*, all of the nitro-



These nitrogen-fixing trees, being grown inside a fenced area, are to be used as goat feed.

gen-fixing trees produced greater than 11 tons of biomass per hectare at Barrigada.

Biomass production not only varied by location and soil type, it also varied by season, with a general decline in vegetative growth from November to February.

Seed Production

D. rensonii and *F. macrophylla* produced numerous seeds regardless of season. *L. leucocephala* and *S. sesban* produced more seeds in the alkaline soils of Barrigada and Yigo than in the acid soils of Ija.

Plant Pests

The main troublesome insect pests were mealybugs, Chinese rose beetle and longhorn beetle. No

serious foliage, stem or floral diseases were observed.

Potential Benefits

The project provided information on selecting nitrogen-fixing trees suitable to different soil types on Guam. The results were disseminated via a technical publication, eight pamphlets and a 15-minute video to local high schools and offices of the Guam Cooperative Extension and USDA-NRCS in Guam and the Commonwealth of the Northern Mariana Islands.



Data are collected on height and girth.