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About the Institute
The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

A

DAVID J. ROGERS, Allegheny College

Grant No. 1565 (1953), $750. Variation in *Manihot utilissima* and related species.

The grant was made to assist in the collection of materials and to establish further experimental work in two areas, Jamaica and Costa Rica. With some changes, this plan was followed.

Upon arrival in Jamaica, I was notified that the Department of Agriculture had ruled against importation of any varieties from any other area. Since the original plan was set up for the study of the varieties from all areas of the tropical world under uniform conditions, there had to be a complete revision of the experimental work to be done in Jamaica. A sufficient number of varieties occur in Jamaica, however, to make possible another aspect of the same study.

Two general types of "cassava" are known, the so-called "bitter" varieties, with a lethal amount of hydro-cyanic acid (HCN) in the roots, and the "sweet" either without HCN, or a low enough concentration of the poisonous principle to make the sweet varieties edible without any previous treatment. One of the problems in the study is to determine whether there is some genetic difference between the bitter and sweet varieties, or whether the concentration of HCN is governed by environment. That this does not seem to be the case is shown by the fact that both bitter and sweet varieties are usually found intermingled. However, to determine fully the extent of control of this factor, two experimental plots were established in widely different habitats: one in a low coastal zone in the parish of St. Catherine, on the Bodles Experimental Farm of the Department of Agriculture, the other at an elevation of about 2,000 feet in the parish of Manchester on the Grove Place Experiment Station of the Department of Agriculture. The first plot is in an area of heavy marine clay, pH about 7.8, low rainfall, high average temperatures, farmed by irrigation methods; the second has lighter lateritic soils, pH about 6, moderate to heavy rainfall, and moderate, average temperature.

Upon establishment of these plans, efforts were made to collect as many of the local variants of *Manihot utilissima* as possible. The wide variety of habitats on the island proved to produce a surprisingly large number of variations, both of the bitter and of the sweet types. Trips were made with agricultural extension agents or by hired car to all of the southern parishes exclusive of Westmoreland, and to St. Ann and St. Mary parishes on the northern side. On these trips, the agents were instructed to sample cassava plantings at frequent intervals in order to secure as much of the variation as possible. At the same time, samples (dried herbarium specimens) were made of each variant found. Each agent was asked to have six cuttings of each variant sent to the two experimental plots, in order to provide duplicate studies of environmental variations.

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Allegheny College, Meadville, Pennsylvania

Principal Investigator: David J. Rogers

Title of proposed research: Studies in the variation in Manihot utilissima.

Description of proposed research:

Basically this is a problem of botanical taxonomy with an emphasis on studies of inter- and intraspecific variation. The objectives are as follows:

1. To organize a systematic body of knowledge concerning the large numbers of variants which exist in the complex known as Manihot utilissima.

2. To determine some of the effects of man's influence on the evolution of plants.

3. To provide a method by which agricultural scientists may more accurately select plants for greater yield, disease resistance, etc.

The present state of knowledge concerning the variation of Manihot utilissima and related species is difficult to define in that there is no such work of a general character in progress or accomplished. There have been, however, two local publications on the varieties, one in Brazil (Zehntner, 1919) and one in Paraguay (Michaelovsky, 1953). These two works have been done with varieties in cultivation in the two countries mentioned, and these make no effort toward evaluating evolution of the species, nor have they made an effort to define the total variation which is possible within the species.

Procedure:

Work is at present under way for this project. In 1953, local clones occurring in Jamaica were brought together in two stations of the Department of Agriculture. Altogether, 107 different named clones were established with six plants of each clone at each of the stations. In June-July, 1954, these clones were sampled, utilizing techniques to adequately sample populations. Standardized photographs, herbarium specimens of selected portions of the plants, morphological, ecological, and where possible, ethnological data were made and recorded. The raw field data will be analyzed as soon as possible.

Upon completion of field work in 1954, rough comparisons were made and all clones were replanted, this time increasing the number of plants of each clone from 6 to 12. This increase should provide some additional data as to variation within clones and give at the same time some rough ideas of the best clones for agriculture. In 1955, the plants raised at the two stations will be interchanged to check the stability of characters under the differing environmental conditions, and at the same time allow certain tests by the Department of Agriculture as to fertilizer requirements, culture techniques, prevention of disease, etc.

In Turrialba, Costa Rica, on the grounds of the Inter-American Institute of Agricultural Sciences, an introduction garden for variants from all parts of the world has been established. Through the efforts of Dr. Jorge Leon, locally occurring clones had already been assembled, and preliminary

studies were made there in July-August, 1953. An exchange of selected clones between Bogor, Indonesia and Campinas, Brazil has been arranged with Turrialba serving as a quarantine station. These plants can be incorporated into the introduction garden, and should be ready for analysis by June, 1955. Other countries in South America, namely Peru, Colombia, Venezuela and Paraguay have been asked to contribute their clones and several have already begun shipments.

With these activities in progress, it is essential that I return to make further analyses. It is necessary that I return to Jamaica for about four weeks to continue the work which has been started, but the largest amount of time (June-July, part of August, 1955) will be spent in Turrialba, working with the local and introduced material.

Facilities:

Allegheny College's Department of Biology is adequately equipped to handle the work during the winter months. The only additional requirement is adequate storage space for herbarium specimens.

Personnel:

a. Biographical sketch of the chief investigator

Age: 37, born October 19, 1918
Place of Birth: De Funiak Springs, Florida
Parents: Both native citizens of the US, father deceased; mother living, retired from the University of Florida
Health: Excellent, wear glasses, vision corrected to 20/20; no deformities.
Marital Status: Married, two children, ages seven and four.
Education: High School, Walton High, De Funiak Springs, Florida.
BS, University of Florida, Gainesville; major: botany, systematic and general, minor: soils. graduated 1941.
MA, PhD, Washington University, Henry Shaw School of Botany. Major: systematic botany. Research in systematics of flowering plants, specialty: Euphorbiaceae. Doctoral Dissertation: "A Revision of Stillingia in the New World." Graduated 1951.
Army: Active service as Field Artillery officer, 1941-1945, released from active service with rank of Captain, was awarded Silver Star and Purple Heart decorations for action in North African Theater of Operations.
Experience: In addition to administrative and teaching positions in the army, was student assistant in major courses since undergraduate days. Present position begun in September, 1951 to present. Assistant Professor of Biology teaching general botany, general and pathogenic bacteriology, staff member of general education course (Organism and Environment), histology, field botany, and special problems in biology.
Research: Field work in Mexico (state of Nuevo Leon and Tamaulipas), general plant collections with Fred G. Meyer, summer of 1948, sponsored by the Missouri Botanical Garden. Present project of research in variation of Manihot utilissima begun in 1953 with field work in Jamaica and Costa Rica in summer of 1953, supported by American Philosophical Society and Allegheny College. Summer, 1954, six weeks in Jamaica.
Present Position: Assistant Professor of Biology, Allegheny College, Meadville, Pa.

+Associate

Allegheny College Sept 1951 - July 1957 Present Position Ed + Curator G.B.

Publications: 1. Stegnosperma: A New Species and a Generic Commentary, in Ann. Mo. Bot. Gard. 36: 475-477, 1949
2. A Revision of Stillingia in the New World, in Ann. Mo. Bot. Gard. 38: 207-259, 1951
3. Variation in Manihot utilissima and related species, in Yearbook of Am. Phil. Soc., 166-168, 1953

b. Additional personnel:

As much as possible undergraduate assistants will be utilized. At the present moment, only one student is available, but am hoping to have at least two undergraduates assisting in work on some of the routine investigations. The one I have chosen is a junior biology major, with specific interest in botanical sciences. Her ability is much above average.

Budget:

a. Salary of the principal investigator
$400.00 per month for two months (July-August, 1955) ------ $ 800.00

Salary for assistant

$35.00 per month (regular payment rate for assistants in Allegheny College) nine months Sept.-June, 1955-56 ------ 315.00

b. Permanent equipment
One Steel herbarium case ---------- 172.00

c. Expendable equipment and supplies
Mounting paper for specimens 500 sheets at $11.50/100 ----- 57.50
Aluminum drying ventilators, 5 doz. at $9.60/doz. --------- 48.00
Black and White film (Kodak Super X, Tropical Pack) ------- 40.00

d. Travel

Meadville, Pa. to Turrialba, Costa Rica, Medellin, Baranquilla Colombia, Kingston, Jamaica, and return to Meadville, Pa. Estimated by Pan American 1st Class Schedule ---------- 425.00

Per diem during travel $6.00 per day, 90 days ---------- 540.00

e. Other direct costs--none

f. Indirect costs ---------- 359.60

Total $2757.10