Progressive
Agriculture
in Arizona
Volume XXVI, No. 3, May-June, 1974

Indian Corn

(page 14)

College of Agriculture, University of Arizona, Tucson 85721

Our Cover . . .

Five ears of corn being grown on Indian Reservations in Arizona are shown on our cover. The colors of the ears range from white, to black, to blue, to red, as well as one showing a blend. These are examples of dent, flower, and flint types of corn. In Arizona Indians use the flower type for human consumption because it is softer than the other two types. Today most of the corn used for livestock feed is of the dent type. For more about Indian corn please turn to page 14.

In this Issue . . .

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Figure 1. This illustration demonstrates how ponderosa pine forest provides summer range for Arizona grazing livestock. (Photo: U.S. Forest Service)

Predicting Herbage Production from Forest Growth in Arizona Ponderosa Pine

*by Peter F. Ffolliott & Warren P. Clary**

Many empirical relationships have been developed to describe annual herbage production in relation to forest density. These relationships provide a basis for estimating differences in annual herbage production beneath varying forest densities (Ffolliott and Clary 1973). However, while herbage production is a measure of annual yield, expressions of forest density (volume, number of trees, etc.) describe a cumulative production situation at a point in time. This may be unfortunate, as it is often desirable to evaluate these natural resource yields (herbage and wood) on a common time scale. Such evaluations facilitate decision-making relative to which combination of herbage and wood should be produced on an area.

As little work has been directed toward the development of relationships between annual herbage production and annual forest growth, an exploratory investigation was conducted to synthesize such relationships for Arizona ponderosa pine (*Pinus ponderosa*) forests. More specifically, the study was designed to develop relationships between annual herbage production and annual forest growth in the ponderosa pine type existing on volcanic soils along the Mogollon Rim.

Description of Investigation

The source data utilized to satisfy the study objective were obtained from 21 sites located throughout the specified investigation area (Figure 2). On these sites, herbage consisted of perennial grasses, forbs, and half-shrubs. Herbaceous species which predominated on one or more of the study sites include the following.

Arizona fescue
Festuca arizonica
black dropseed
Sporobolus interruptus
blue grama
Bouteloua gracillis
bottlebrush squirreltail
Sitanion hystrix
broom snakeweed
Gutierrezia sarothrae

(Please turn page)

**Associate Professor, Department of Watershed Management; and Principal Plant Ecologist, Rocky Mountain Forest and Range Experiment Station, U. S. Department of Agriculture Forest Service, Flagstaff, Arizona; respectively.* *This study is part of the Arizona contribution to the U.S. Department of Agriculture Regional Research Project, W.-119, Evaluations of Alternative Land Uses on Forest, Range and other Wildlands.*

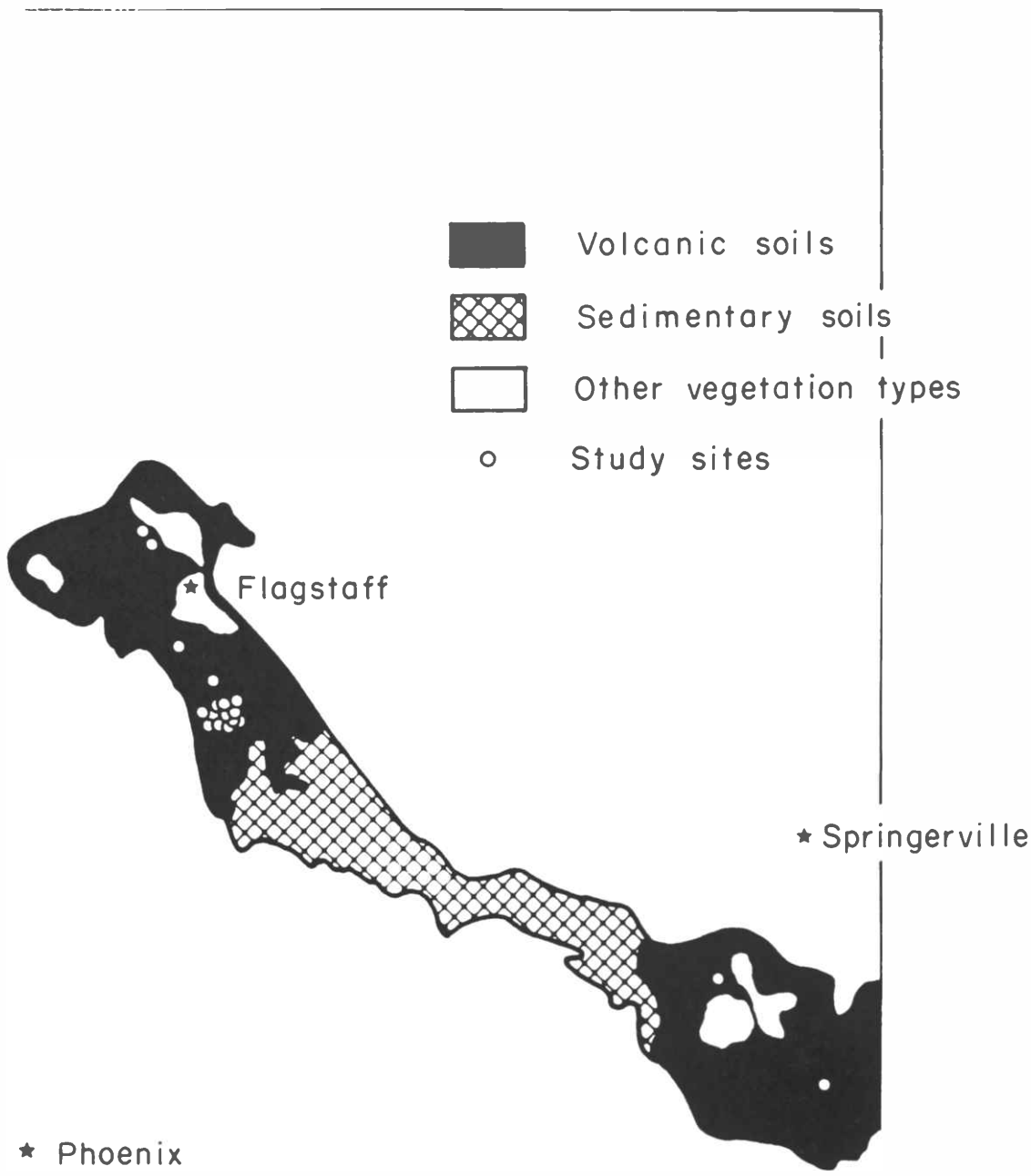

Figure 2. Study sites located throughout the Arizona Ponderosa Pine type of volcanic soils along the Mogollon Rim.

crested wheatgrass
Agropyrom desertorum
intermediate wheatgrass
Agropyron intermedium
Kentucky bluegrass
Poa pratensis
lupine
Lupinus spp.
mountain muhly
Muhlenbergia montana
mutton bluegrass
Poa fendleriana
orchardgrass
Dactylis glomerata

Ponderosa pine, including all age classes in intermixture, dominated the forest overstories, with Gambel oak (*Quercus gambelii*) and alligator juniper (*Juniperus deppeana*) minor species.

The volcanic soils on the study sites ranged in texture from silt-loam to gravel-loam.

Annual herbage production, expressed in pounds per acre, was determined by weight estimate on 25 to 93 9.6-square-feet plots on the study sites (Pechanec and Pickford 1937). Annual forest growth, expressed in cubic feet of merchantable ponderosa pine wood per acre, was assessed by stand table projection (Ffolliott 1965) or Schneider's growth percent formula (Davis 1954). Additionally, average water year (October 1 to September 30) precipitation and mean elevation were determined for all study sites. Water year precipitation corresponds better with the amount of water available for plant growth in a season than does calendar year precipitation. Mean elevation is a possible alternative variable to precipitation when knowledge of precipitation is not available.

Minimum, mean, and maximum of attributes that characterize the study sites are given in Table 1.

Initially, annual herbage production was defined as a function of annual forest growth only. Subsequently, average water year precipitation and mean elevation were included to improve the definition of annual herbage production and annual forest growth within the range of conditions represented by the study sites. As different numbers of years of source data were available among the study sites (1 to 12 years), a weighted regression analysis was used.

Results and Discussion

Annual herbage production decreased with increasing annual forest growth, as was expected. Furthermore, and what was not expected, the mathematical form that these competitive relationships assumed was linear (straight-lined) in all cases. Herbage-forest relationships that have previously been developed with forest density attributes generally assumed nonlinear forms.

The competitive and linear relationship developed between annual herbage production (H) and annual forest growth (G) indicated that, for the data analyzed, the magnitude of a sacrifice that is required in one to achieve a gain in another remains unchanged throughout the range of data; in other words, the rate of "trade-off" is the same. This relationship is

Table 1. Minimum, mean, and maximum of attributes on study sites.

Unit of Measure	*Variable*	*Minimum*	*Mean*	*Maximum*
Annual herbage production	**Pounds per acre**	**131**	**588**	**1540**
Annual forest growth	**Cubic feet per acre**	**0.0**	**18.1**	**63.0**
Average water year precipitation	**Inches**	**17.0**	**22.6**	**28.9**
Mean elevation	**Feet**	**6250**	**7135**	**8800**

$$H = 804 - 14.9\ (G)$$
$$r^2 = 0.88$$

Given knowledge of the annual forest growth, which may often be available from forest resource inventories, this relationship can be evaluated directly to predict annual herbage production.

To provide a basis for predicting annual herbage production from knowledge of annual forest growth within either precipitation or elevational strata, appropriate relationships involving these variables were developed. In essence, these relationships assume families of competitive and linear curves, with each member of a family defining the relationship between annual herbage production and annual forest growth for either a precipitation (P) or elevational (E) stratum (Figure 3). As information describing annual forest growth and precipitation or elevational characteristics can usually be obtained more readily than information describing annual herbage production, these relationships may become useful working tools for the land manager concerned with range resources in Arizona ponderosa pine forests.

The use of the relationships in Figure 3 can best be illustrated by an example. Annual forest growth on a ponderosa pine tract in east-central Arizona is 35 cubic feet per acre. This tract receives approximately 23 inches of precipitation annually, and it is located at 7,200 feet in elevation. Using the graphs in Figure 2, annual herbage production is estimated to be 290 pounds per acre, based on the precipitation variable, and is 300 pounds per acre, based on the elevation variable. The small discrepancy between the estimates of annual herbage production on this site is due, primarily, to statistical variability in the respective regressions. In most instances, such differences will be small. If differences are large, the estimate based on the precipitation variable may generally be assumed more reliable.

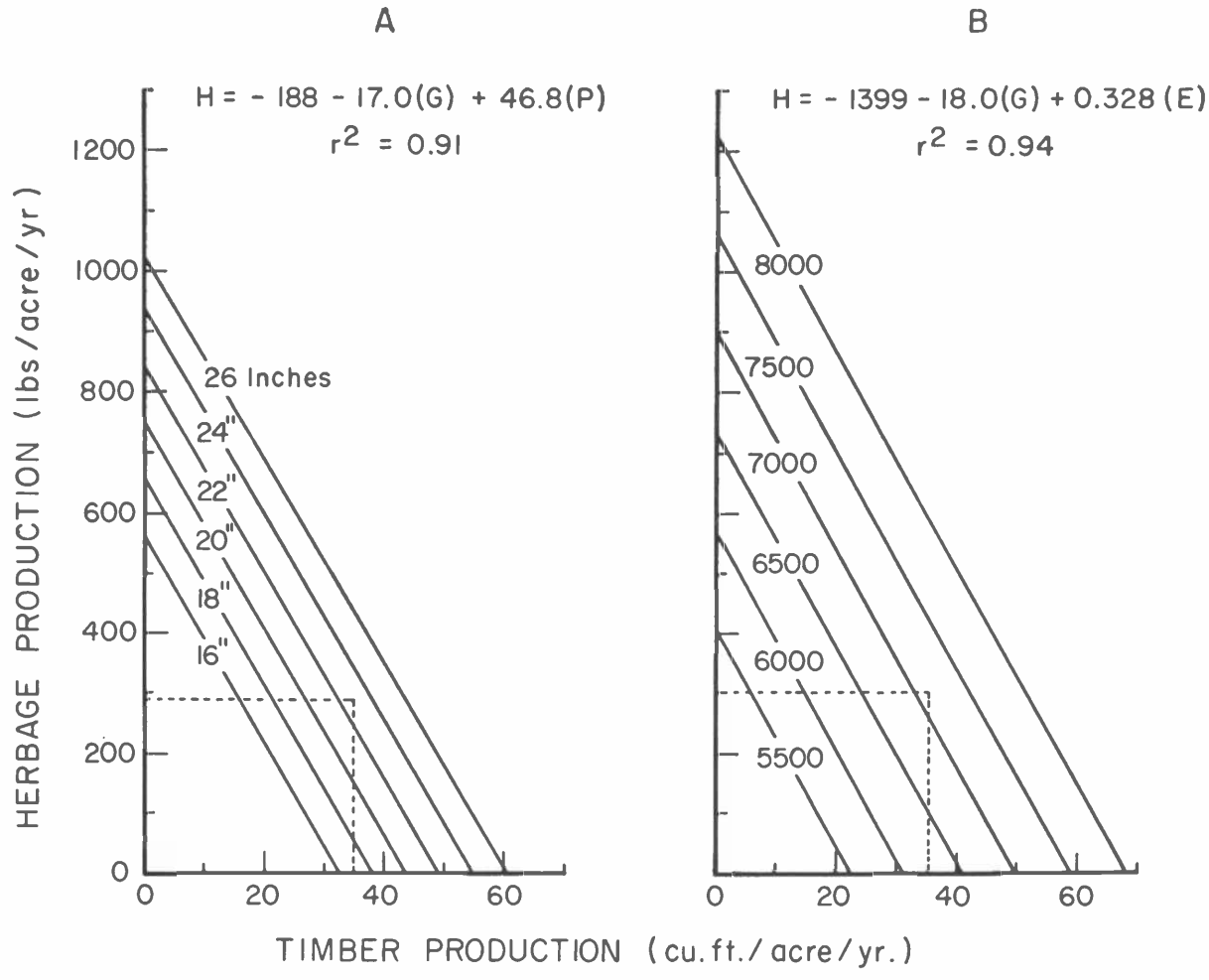

Figure 3. Relationships between annual herbage production and annual production of wood within A precipitation and B elevation strata.

Figure 4. A ponderosa pine forest provides dual utility and production of fiber and forage for Arizona's productive economy. (Photo: U.S. Forest Service)

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Pechanec, Joseph F., and G. D. Pickford. 1937. A weight estimate method for determination of range or pasture production. J. Amer. Soc. Agron. 29:894-904.

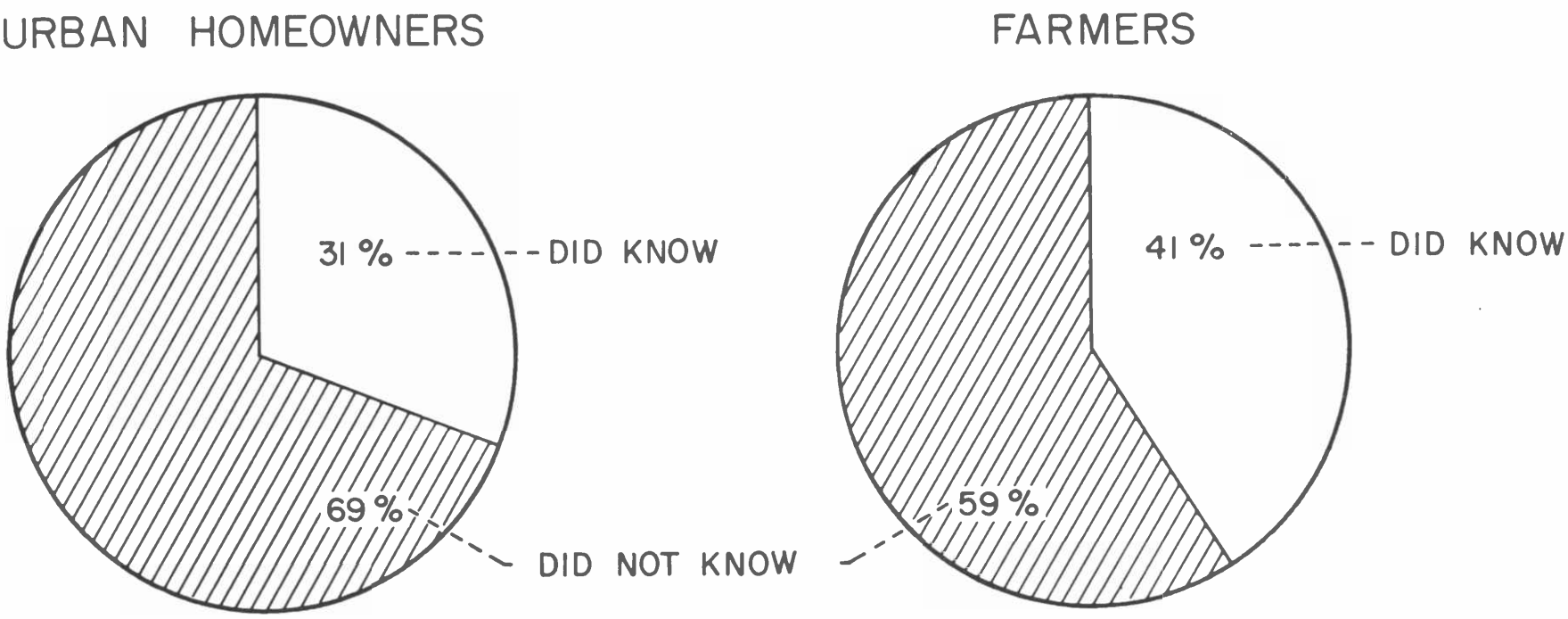

Figure 1. Percentage distribution in response to the question — "Do you know the existence of Poison Control Centers in your community?"

Rural & Urban Residents . . . Differ in their Knowledge & Attitudes about the use of Insecticides*

by J. Ryan,

R. Stoller,

and L. Moore[2]

The use of insecticides has, in the last three decades, become an indispensable part of modern agricultural technology. In the present prospect of food shortages, their role may be even more crucial. Without chemical control of agricultural pests, not only would total farm production decrease, but increased food costs would have to be borne by the consumer. Since their introduction, the use of insecticides in agriculture has increased along with the development of a wider range of pesticides. Inevitably, a wave of concern developed about the potential hazards of insecticides both to man and to his environment. Public awareness was increased by the publication of Silent Spring by Rachel Carson in 1962.

Official concern about insecticides was evidenced by the establishment of a Presidential Scientific Advisory Committee in 1963 to investigate the effect of pesticides on man and his environment. While recognizing the need for continued use of insecticides, their possible dangers were emphasized by the Committee and greater educational efforts were urged to inform the user and general public about safe use.

The study reported herein provides a measure of the rural and urban public's opinion regarding various facets of insecticide use. It identifies several prevailing misconceptions and highlights the principal sources of information about insecticides.

Procedures for Opinion of Rural and Urban Residents

The target populations in this study were homeowners in Tucson and commercial crop farmers in Pima and Pinal counties. The basic premise in selecting two populations, urban and rural, was that their responses to variables would differ significantly between the two groups. The experimental groups of 200 in each group were chosen randomly from the City of Tucson Directory (1972) and from a list of commercial farmers in Pima and Pinal Counties (1973). In essence, the groups represented a large urban area and the predominantly agricultural rural community. A closed form of questionnaire was used to obtain the necessary information from individuals in the study groups. After five weeks a second mailing of questionnaires was made along with a personal letter.

Thirty four percent of the persons returned questionnaires with a slightly higher response from the rural group. The results were analyzed sta-

[1] *Part of an M. S. thesis in Agriculture Education (Extension Option) by the senior author.*

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tistically with significant differences noted at the .01 and .05 levels. The most noteworthy features of the study are presented in the following discussion. The rural group is referred to as farmers and the urban group is referred to as homeowners.

Summary and Implications

While the findings indicated general public acceptance of insecticide use for various purposes, a consistently higher percentage of farmers than homeowners felt there was a need for insecticides on crops, in the home and in the garden. With respect to use on animals, only 54% of urban homeowners felt insecticide use was necessary compared to 85% of farmers.

Farmers and urban dwellers differed in their views on the economic implications of insecticide use. Farmers were more positive of the indispensability of insecticides in agriculture and were less willing than urban homeowners either to accept poorer quality foodstuffs or to make any financial sacrifice as a result of increased food costs if insecticides were not used. A higher percentage of farmers felt that food prices to the consumer would rise if insecticides were prohibited.

The urban group was apparently more concerned about the implications of insecticide use in relation to the environment and wildlife and was generally opposed to them from this standpoint. Fewer farmers considered insecticides to be environmental pollutants and a higher percentage of farmers answered that insecticides could be used to "improve the quality of the environment."

The vast majority of both groups replied that they usually read the labels on insecticide containers and believed them to have sufficient information for safe and effective use. While the majority of respondents were apparently aware of the hazards involved, a higher percentage of farmers (96%) than homeowners (73%) answered that the insecticides they used required careful handling. Notwithstanding the fact that the range of insecticides used varies with specific purposes, this discrepancy may suggest a complacent attitude towards insecticides by the urban group.

Both groups recognized that insecticide residues may accumulate in food produced and in the human body. However, the urban group was apparently more concerned about the possible adverse effects of these residues on health. This was reflected in the fact that almost twice as many farmers (65%) as homeowners (34%) did not consider insecticides to be a possible cause of cancer.

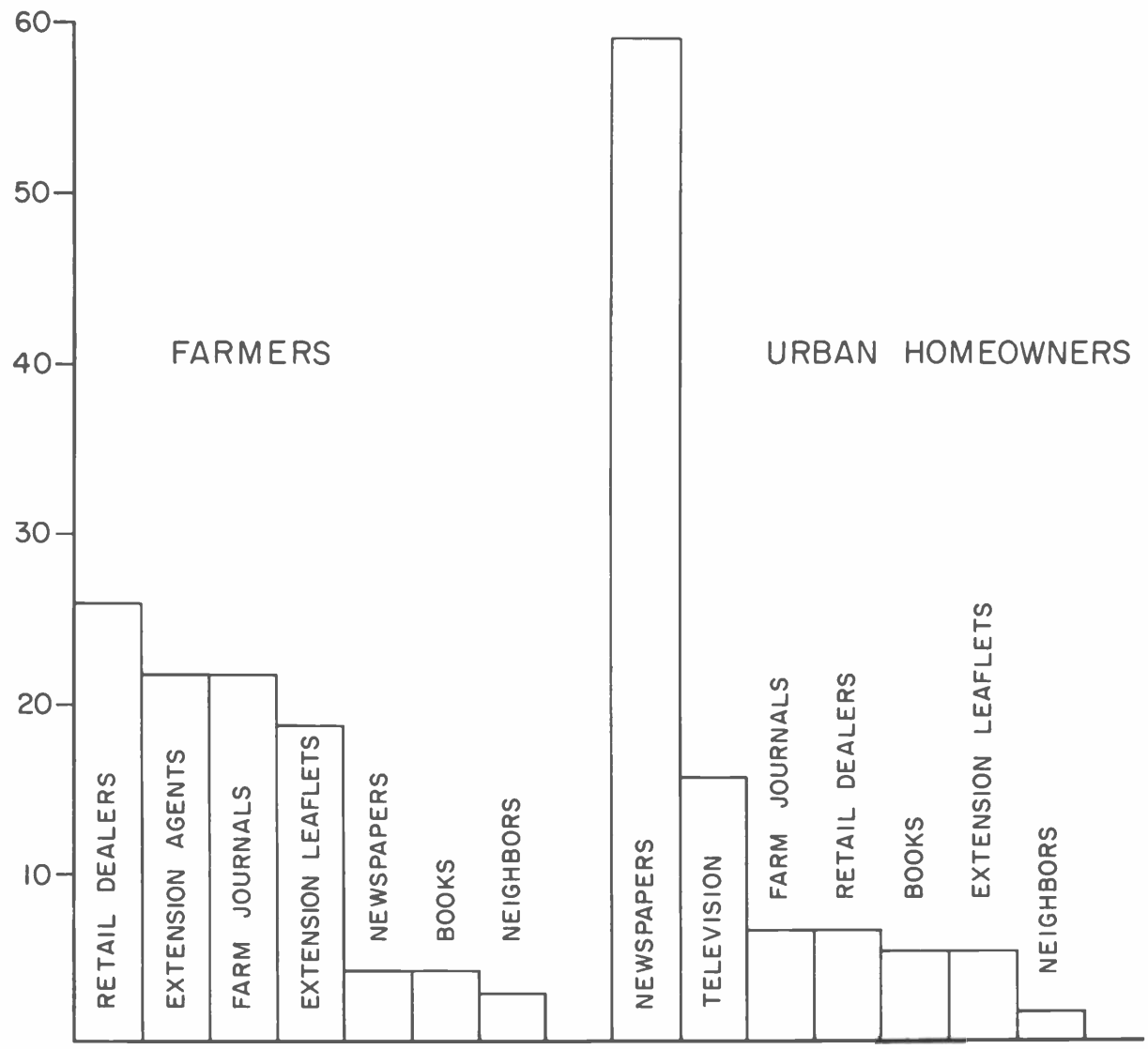

Figure 2. Percent Distribution of Principal Sources of Information About the Use of Insecticides for Farmers and Urban Homeowners.

Both study groups were poorly informed of Poison Control Centers available for treatment of cases of insecticide poisoning. (Figure 1) Less than 50% knew of Poison Control Centers in their community or of hospitals which gave information on or treated cases of insecticide poisoning. Fewer homeowners (48%) than farmers (73%) believed that their local doctor was capable of dealing with cases of insecticide poisoning. However, most of them agreed that information on the product label would be useful to the doctor in such an event.

The urban group had little knowledge of the law in relation to insecticides. This was consistent with the findings of Brooks (1973) that rural audiences were more knowledgeable than their city counterparts in all aspects relating to pesticides. Most farmers were aware of the 1972 pesticide law and believed that this law affected them. However, only 60% of homeowners knew of this law and only 13% said they were affected by it. Similarly, a significantly greater percentage of farmers knew that insecticide use was controlled by law and that the law required sampling of foodstuffs in order to determine whether they contained excessive amounts of pesticides.

Farmers responses reflected a higher degree of knowledge of insecticide properties and uses than did homeowners. The latter group had an exaggerated notion of the toxicity of DDT whereas the rural group correctly rated the order of toxicity of a group of insecticides. However, both groups lacked knowledge as to the

(Turn to page 16)

Brooks, T. M. "The Consumer and Pesticides," Unpublished Study, College of Human Resources, Southern Illinois University, 1973.

CREDIT LIFE INSURANCE... What is it? Who benefits? Do you need it?

*by Linda Mahrer & Janet Vaughn***

"Yes, I think we can arrange to sell you the refrigerator on a time plan. Please step over to the desk and let's talk to the credit manager."

For about three months Jim and Lory have been shopping for a refrigerator, and after considering their needs, they settled on a model.

The couple listed with the credit manager three local credit references. They had $100 for a down payment and were willing to repay the $300 balance in twelve months.

"Fine!" said the credit manager, "I'll get the sales contract ready. Oh, by the way, do you want credit life insurance?"

Jim and Lory looked at each other and said "What's credit life insurance?"

What Is Credit Life Insurance?

Individual credit life insurance is a contract between an insurance company and a borrower who is using credit to make a purchase.

This borrower is insured for the amount of his purchases.

This insurance is based on the idea that no man's debts should live beyond him. It is an outgrowth of the great increase in use of credit by consumers. This increase began about 1945, when people began to purchase goods on a delayed payment basis. The payment could be either one lump sum (noninstallment credit) or, more commonly, in two or more regular, usually monthly, payments (installment credit).

Few days pass without family making purchases with credit. What would happen if those providing the income for payment died and income was cut or eliminated completely? Would there be enough money to make the payments?

With credit life insurance the death benefit equals the balance outstanding on the borrower's debt. If he dies, the benefit is used to resolve the borrower's o b l i g a t i o n. This applies whether an item is purchased on an installment plan or a cash loan is obtained to pay for medical bills or groceries. As a type of decreasing term life insurance, it offers protection, but no cash value, for the duration of the contract.

Purposes of Credit Life

The purpose of credit life may be considered from two different points of view: (1) that of the lender or creditor, and (2) that of the borrower.

From Creditor's Standpoint:

Creditors feel this insurance helps to guarantee to him that the financial obligation will be paid in full should the borrower die. If the insured leaves dependents, the creditor avoids having to try to collect from the insured's estate.

The creditor's risk is reduced if borrowers buy credit life. And, as a result, he extends more credit which increases sales volume.

From Consumer Standpoint:

What purposes does credit life insurance serve for the consumer? First, we should define family, a commonly used term which can have several meanings.

1. "A family is a group of two or more persons related by blood, marriage, or adoption, and residing together. 2. It is a group of persons, usually related, living in one dwelling unit and dependent on a common or pooled income for major items of expense.*** 3. Households of unrelated people can be called a family, as can an individual living alone. The meaning attached to family becomes particularly important in the discussion of insurance. One of the main purposes of insurance is to provide some measure of protection or security for dependents. In the case of credit life insurance, dependents could mean people in any of the defined groups.

Credit life may give the insured pride in his ability to meet credit obligations. It may give him peace of mind in knowing that any dependents or survivors will be able to keep any goods they now have. Survivors need not be harassed by creditors or col-

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****U. S. Bureau of the Census, Statistical Abstract of the United States*: 1970 (91*st Edition*) *Washington, D. C.*, 1970, *p.* 3.

(Please turn to page 9)

lection agents trying to collect unpaid bills. The insured knows that, should he die leaving credit obligations, the debt will be paid by credit life, not with proceeds from other life insurance policies intended for family income.

Not all of the benefits of credit life insurance are obtained at death of the insured. He receives the service of protection if he lives. Some creditors are more willing to lend money if credit life guarantees repayment, and cosigners may be easier to find.

How Credit Life Developed

Perhaps the reason Jim and Lory didn't know about credit life insurance is due to the fact that the growth and use of credit life is relatively new. Many are unfamiliar with it.

Individual credit life policy is a contract issued to and covering only one person. It was first used in 1917. *Group* credit life is written for an entire group of people. It became available in 1930. After World War II consumers began to make regular purchases with credit. Money incomes and flow of goods increased. More women became employed outside the home thereby increasing the demand for durable equipment such as appliances.

The number of young people in the population increased much faster than in other age groups. This trend is important because those most inclined to use credit, and thus probably credit life, are young marrieds whose annual income is $7,500 to $15,000. They have young children and are buying furnishings and possibly a home. Their income doesn't match their needs and wants. They buy on credit, according to the 1969 National Commission on Consumer Finance Study.

As more families rely on multiple incomes, a type of credit life known as *joint* credit life has been made available. This is a policy naming two people as insureds, as a husband and wife. If either dies, benefits are payable, and can be used to pay credit obligations leaving the surviving worker's income for current family expenses.

Who Needs Credit Life?

A second question is, who needs credit life? To help evaluate an individual situation the following points can be considered.

Dependents and their needs. Maybe there are children and a spouse, retired parents, a brother, sister or aunt who are wholly or partially dependent upon the borrower's income. If he dies with credit outstanding, would all his estate be taken to repay creditors, or would it be retained for use by the dependents? If there are no dependents, would the estate be large enough to repay creditors or would they simply lose part or all of the loan?

What is bought. Here is considered whether the purchase is a necessity, a convenience, or a luxury. A family head may wish to be assured that survivors could keep a necessity. He may not be too upset about them having to return or sell a luxury. He may look at a convenience in terms of whether it might be more of a necessity in his absence.

Also he would consider whether the purchase is a durable, a nondurable, or a service. A durable good, useful over a relatively long period of time, such as a refrigerator, retains some value over time. The seller could repossess or take back the item and perhaps get a limited return by selling it. Nondurables and services have limited use, with relatively little or nothing which can be returned or sold to raise money to repay the creditor.

A point to consider when buying on credit is that, legally, the seller retains title to goods until they are paid for.

How purchases are financed. For cash purchases credit life insurance is not needed. With purchases by installment credit, credit life may not be needed if the loan is fully secured, that is, backed by property — collateral — valued at an amount at least as much as the amount of the debt. On the other hand, if a borrower would not want his dependents to lose the property pledged as collateral, or if the loan is not fully secured, he may want credit life's protection.

What credit life can do for the consumer.

It can give peace of mind to the insured and his survivors. It can help survivors maintain their level of living after the insured's death and guard against collection or repossession. Credit life is usually sold in group policies not requiring physical exams of applicants. So it may be one of the few types of life insurance for which people with health problems can qualify. Some health conditions make consumers ineligible for individual life insurance.

What credit life can't do for the consumer.

Credit life will not solve all credit worries. Though it does provide a service to consumers, be sure you're aware that credit life will not provide any *cash* benefits if debts are repaid entirely within the insured's lifetime. The insured receives nothing if his income is stopped for reasons of health, accident, or unemployment. Other types of insurance — credit accident and health, and disability insurance — protect against these risks.

Because the amount of credit life insurance is equal to the unpaid balance of the debt, dependents can't collect enough money to repay the debt and have money left over.

Credit life is a type of term insurance. This means the policy has no cash value against which to borrow.

Credit life can't prevent assuming more credit than the borrower's income will support. A specialist in family economics, a family financial advisor, or a loan counselor can help you with that question *before* buying on credit. Residents of Arizona and other states can get information on credit, insurance, and other aspects of money management from Home Economics Extension Agents working in the Cooperative Extension Service in each county.

Alternatives to credit life. Perhaps a consumer can see some benefits in the use of credit life, but still isn't convinced to buy it. There *are* other alternatives — other ways to deal with the risks. One is to look at the laws of probability and assume that he will live at least long enough to pay the debt.

A second alternative is to plan to have enough assets on hand to pay debts should there be the need.

A third option involves insurance. This is the purchase of decreasing term from a private insurance agency, other than the creditor. This may be less expensive for comparable protection, even though most credit life today is purchased from creditors. Remember it is usually less costly to buy credit life as a group policy.

DISCLOSURE STATEMENT OF LOAN

BORROWERS (NAMES AND ADDRESSES):

LENDER: LOAN NO._____ Date_____

(Street Address)

(City) (State) (Zip)

TOTAL PAYMENTS	FINANCE CHARGE	AMOUNT FINANCED	ANNUAL PERCENTAGE RATE:	CREDIT LIFE INSURANCE CHARGE	DISABILITY INSURANCE CHARGE	PROPERTY INSURANCE CHARGE
	B				D	
$	$	$	%	$	$	$

PAYABLE IN: CONSECUTIVE MONTHLY INSTALLMENTS	DUE DATE OF PAYMENTS			AMOUNT OF PAYMENTS			
	FIRST:	OTHERS: SAME DAY OF EACH MONTH	FINAL:	FIRST:	OTHERS:	FINAL:	RECORDING FEE
				$	$	$	$

INSURANCE

A PROPERTY INSURANCE, if written in connection with this loan, may be obtained by borrower through any person of his choice. If borrower desires property nsurance to be obtained through the creditor, the cost will be $_____ for the tem of the credit.

CREDIT LIFE AND DISABILITY INSURANCE is not required to obtain this loan. No charge is made for cerit insurance and no credit insurance is provided unless the borrower signs the appropriate statement below:

D

(a) The cost for Credit Life Insurance alone will be $_____ for the term of the credit.

(b) The cost for Credit Life and Disability Insurance will be $_____ for the term of the credit.

C	C	C
I desire Credit Life and Disability Insurance.	I desire Credit Life Insurance only.	I DO NOT want Credit Life or Disability Insurance.
(Date) _____ (Signature) _____	(Date) _____ (Signature) _____	(Date) _____ (Signature) _____

REBATE FOR PREPAYMENT IN FULL. If the loan contract is prepaid in full by cash, a new loan, refinancing or otherwise before the final installment date, the borrower shall receive a rebate of precomputed interest computed under the Rule of 78's.

DEFAULT CHARGE. (The creditor should set forth the amount, or method of computing the amount, of any default, delinquency, or similar charges payable in the event of late payments.)

SECURITY

DESCRIPTION

A. ☐ This Loan is Secured By a Security Agreement of Even Date covering.....

The Security Agreement will secure future or other indebtedness and will cover after-acquired property.

- ☐ Motor Vehicle(s): Make ..... Serial No.:.....
- ☐ Household Goods & Appliances of the following description:
  .....
  .....
  .....
- ☐ Other: (Describe) .....

B. ☐ This Loan is Unsecured.

I ACKNOWLEDGE RECEIPT OF A COPY OF THIS STATEMENT.

E

Borrower: .....

Witness: ....

This form, when properly completed, will show how a creditor may comply with the disclosure requirements of Truth In Lending for the type of credit extended in this example. (Source: U. S. Federal Reserve System. Board of Governors. What you ought to know about Federal Reserve Regulation Z Truth in Lending Consumer Cost Disclosure. Washington: U. S. Government Printing Office, 1969)

A fourth alternative, when making purchases on credit, is to consider whether the borrower may have enough whole life insurance to cover the credit outstanding. Whole life is that type which provides a cash value which grows as the insured continues to pay premiums for his lifetime. This option could involve assigning the policy proceeds to the creditor to pay credit outstanding at death. Any balance would go to the survivors or the insured's estate.

Dr. Joseph Belth of Indiana University, in his 1973 "Life Insurance, A Consumer's Handbook" to life insurance, advocates this alternative. He feels it decreases the cost of credit. Consumer's Union Report on Life Insurance 1973 also endorses this alternative. One caution: many consumers may already be *under*-insured in terms of survivors' needs. Using life insurance proceeds to pay bills can eat up funds intended for the dependents, leaving less or nothing for them.

Potential Problems

Jim and Lory, and others who buy on credit, need to be aware of potential problems involving the products and services they buy. Credit life is no exception. The National Association of Insurance Commissioners — an organization of the insurance commissioners or directors from each state — appointed a subcommittee in 1954 to study credit life, with Dr. Joseph Gerber, presently a University of Arizona Professor of Finance, Insurance, and Real Estate as chairman. In 1959 the subcommittee adopted a Model Bill for the regulation of credit life insurance. As of summer, 1973, 40 state legislatures have adopted the Model Bill, including Arizona in 1961. Current problems involving credit life are in two catagories: (1) regulation, and (2) disclosure. Both of these are important to consumers. They include questions like: Is state regulation of the sale of credit life effective, or is federal regulation needed? Should sellers of credit life make a profit from the premium or should charges pay only for the actual costs of insuring? Are businesses selling credit life in amounts larger than needed to cover the debt and making excess profits? Are creditors urging consumers to buy credit life even if the consumer doesn't want it?

Are insurance companies charging credit life premiums which yield them more profit than permitted by law? Are consumers being sold insurance for a period of time longer than needed to repay the credit, giving the company more profit? If a consumer pays his debt ahead of schedule, is the unearned premium refunded? If a consumer consolidates his credit obligations — combines several into one — is he paying for both the older separate policies and the new policy?

What Does It Cost?

The NAIC Model Bill states that a credit life company must pay out in claims at least 50% of the amount it collects as premiums. Otherwise it is considered to be making excess profits and the state insurance department can order the company to reduce its rates. Many states have done just that in recent years.

In Arizona, the maximum annual rate allowed for decreasing life is 60¢ per $100 of credit.**** In Jim and Lory's case, where they are financing $300 over a one year period, decreasing credit life would cost them 60¢ x 3 x 1 = $1.80. On a $3,000 loan, say for an automobile, for three years, credit life coverage would cost them 60¢ x 30 x 3 = $54.00.

Truth in Lending

The second category of potential problems involves disclosure. The Federal Consumer Credit Protection Act, commonly referred to as Truth in Lending, became effective July 1, 1969. It states what information a creditor must disclose to the consumer in transactions involving all aspects of credit costs, including credit life insurance.

If a creditor requires the consumer to have credit life as a condition for receiving credit, the creditor must also tell the consumer that the coverage may be purchased from the lender *or* from a source other than the lender **A**. (see **A** on form, page 10). The consumer may choose.

If the required credit life is purchased from the lender, the insurance cost must be included in the credit contract's finance charge **B**. (page 10)

If a creditor does *not* require credit life coverage but offers to sell it in connection with a credit transaction, the consumer must sign a portion of the credit contract indicating that he either *does* or *does not* want the coverage **C**. (page 10) If the consumer, after receiving written statement giving the cost of insurance, signs a dated written authorization that he desires credit life, the premium is *not* required to be included in the finance charge.

According to a Federal Trade Commission investigation in Arizona in October and November of 1973, the most prevalent violation of the Truth in Lending Law***** was failure to indicate the cost of insurance when citing interest rates to consumers. In any installment contract including credit life, the separate insurance cost for the term of the contract must be clearly indicated **D**. (see page 10).

Read Before You Sign

The consumer should not sign an installment contract until each blank has been filled in and he has read the entire contract. Most contracts include the notation that the consumer's signature is an acknowledgement that he has read and received **E** (page 10) a completed copy of the contract. The insured should receive a certificate indicating the name and address of the company providing the insurance coverage, and the amount and period of time of coverage.

Jim and Lory's seemingly simple purchase of a refrigerator with the use of credit became a real learning experience for them. Residents of Arizona and other states and U. S. government jurisdictions such as Guam and Puerto Rico can get additional help with their insurance questions — as Jim and Lory did — from a representative of their state insurance department. These officers can also inform them of the insurance rulings of the state in which they live. Arizona's Director of Insurance, Mr. Millard Humphrey, 1601 West Jefferson, Phoenix 85007, and Deputy Director T. E. Morales at 415 West Congress, Tucson 85701 are anxious to help the people of the state with insurance questions.

A new development in some states is an insurance consumer "hotline." This is a toll free telephone number which residents of that state may use to contact insurance officials regarding problems and questions they may have.

Did Jim and Lory get credit life insurance when they purchased the refrigerator? Would you?

****As of February 1, 1974. Prior to that time the annual rate was 70¢ per $100 of credit.*

*****"Firms to Stop Unlawful Acts," TUCSON DAILY CITIZEN, Jan. 21, 1974, p. 21.*

Establishing a Plant Virus Research Program in N.E. Brazil

*by Merritt R. Nelson & J. Albersio A. Lima**

Figure 1. Professor Lima, technicians Julita Maria Frota Chagas and Antonio Apoliano dos Santos working with centrifuge.

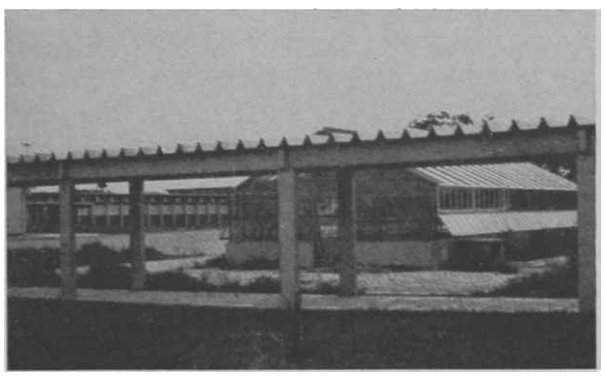

Figure 2. Greenhouse being converted to a screenhouse for plant virus research.

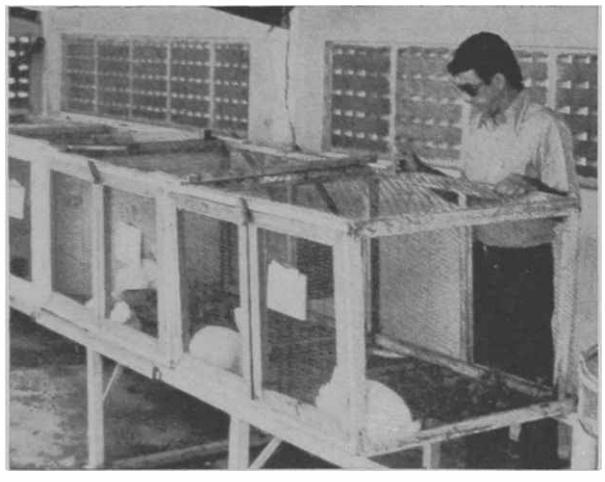

Figure 3. Professor Lima and rabbits to be used in serological studies of plant viruses.

While the importance of plant virus diseases have long been recognized in the state of Ceara, Brazil, it was not until the beginning of 1973 that a full fledged active research program was begun. This new program was possible because of the University of Arizona's contract with USAID for furthering development of the Esocla de Agronomia, Universidade Federal do Ceara. This contract made is possible for Professor Lima to receive training in plant virology at Tucson and also possible for his major professor, the senior author, to spend 6 weeks in Ceara, at the conclusion of Professor Lima's training, to advise him in the initial phases of the work.

As with any plant disease the first problem encountered with a virus disease is identification of the pathogen. This is particularly difficult with a virus disease because the properties of viruses useful for identification are those relating to their resemblance to chemical molecules. A microscope and cultural facilities are usually adequate for working with most other plant pathogens. Such facilities have long been available in Ceara. Under ideal conditions ultracentrifuges, spectrophotometers, an electron microscope, greenhouse facilities, growth chambers, animal rooms and a well equipped laboratory are desirable for virus work. The challenge of this project was to bring modern virology to Ceara with far less equipment. Ironically enough, recent advances in virus methodology have made dependence on high priced "complicated machines" less crucial for an up-to-date research program. In addition to having some equipment available, it is also important to establish and maintain contacts with virologists in all parts of the world so that exchanges of materials with scientists working on similar problems be maintained. Often through such contacts and exchanges of materials, virus identifications and characterizations can be made that would not be possible any other way.

The easiest and most positive way to identify plant viruses is by serological tests. Such tests are simple to perform and require little equipment. The principal difficulty is that the specific virus antiserum needed to conduct such tests must be prepared in a warm blooded animal using an identified, purified, concentrated solution of the specific virus in question. This solution is injected into the animal and, while no infection takes place, the animal (usually a rabbit) develops specific antibodies to the virus. These antibodies are obtained by bleeding the animal (without killing it) and separating the serum bearing the antibodies from the blood cells.

There are two ways of obtaining antiserum. One is to make it yourself as described above; the other is to request small samples of antisera from other researchers who have worked with the same or similar viruses. In establishing the program in Ceara the latter method of obtaining antisera was used initially (22 obtained) and the former method is being developed for future and sustained activity.

The technical developments required to support antiserum production revolves around the methods required for virus purification. New methods of precipitating viruses with polyethylene glycol 6000 have reduced dependence on the high priced "god" of the virus lab, the ultracentrifuge, and made it possible to do much with a low speed (10,000 rpm or less) centrifuge. Such a centrifuge is ideally refrigerated but this is not an absolute necessity. Other equipment needed includes a grinder to extract plant juice, a pH meter and various other common pieces of laboratory equipment. Another essential required is a plant propagating facility in which virus sensitive test plants can be raised and inoculated. It is here that other useful properties of the virus such as symptoms and host range can be determined and where quantities of infected plant tissue for virus extraction and purification are grown. Finally, to pursue the program as outlined, a source of suitable rab-

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**Professor of Plant Pathology, University of Arizona, Tucson; and Professor of Plant Pathology, University of Ceara, Fortaleza, Brazil; respectively.*

Saving Energy

while using appliances

*by Doris Broten**

A recent Stanford Research Institute report states that major home appliances use approximately 5.3 percent of the energy consumed in the U.S. While the energy crisis will not be solved by efficiency moves directed to appliances alone, contributions through appropriate methods of using them can be made. With increased utility rates, reduction of usage will reduce the utility bill.

There are many ways that families can reduce amounts of energy consumed in use of appliances. A few simple skills can be of great assistance.

Skill in reading the nameplate on electrical appliances will show how much energy will be consumed by the appliance. This information along with the amount of time the appliance is in operation can be used to compute the cost of operation.

Sample: A toaster oven nameplate shows that it requires 1500 watts of power. Since 1000 watts is equal to one kilowatt, the toaster oven uses 1.5 kilowatts. In one hour, the toaster would use 1.5 kilowatt hours. (watts x time) If the rate for electricity is 3 cents per kilowatt hour, the cost for operating the toaster oven for one hour (assuming it is drawing power the entire time) would be 4½ cents.

This information can be used in making a choice of which piece of equipment to use to do a particular job. For instance, assume an electric skillet or a toaster oven (1200-1400 watts) is available in addition to a regular (built-in) oven (4800 watts). For certain dishes, especially small portions, the portable appliance will require less energy than the regular oven.

Skill in planning can also benefit energy conscious consumers. By utilizing appliances to the recommended capacity, optimum benefit will be obtained. Examples of helpful planning include: washing only full loads; preparing an entire meal in the oven, or baking several things at once; preparing large amounts of food at once and freezing meal size portions for later use; and using dishwasher only when full. One caution should be observed. Use appliances according to instructions provided by the manufacturer. Overloading can harm the appliance and produce less than satisfactory results. This may apply especially in the case of a dishwasher or washer.

The hot water heater is at the top of the appliance list for power usage in the home. Turning down the thermostat can reduce power consumption. A hot water heater requires from 2000-4000 watts for conventional or 6000 watts for a quick recovery model and operates about 4 hours total per day, on the average. Draining the sediment off the bottom of the tank regularly allows the water heater to operate to capacity.

Ranges require large amounts of power. A conventional range requires from 14,000 to 16,000 watts. A single built-in oven requires about 4800 and a built-in surface cooking unit 4800. The larger the burner, the greater the wattage.

Often maligned is the pyrolytic self-cleaning oven. However, current research done by General Electric has shown that this work saving feature is actually an energy saver, too. The oven is well insulated to prevent excessive heat loss during the cleaning cycle, and it actually requires only about 85 percent as much energy as a regular oven for normal oven cooking. This margin of energy conserved is equal to the energy needed for 12 oven cleanings per year. Since the kitchen will stay cooler during regular baking, some savings in air-conditioning may be realized.

Microwave ovens are often promoted as energy savers. It is true that they do require less energy than a conventional oven and are very quick. However, they are not designed to do all cooking normally done in a household. A regular oven still is needed for many preparations.

An automatic clothes dryer requires from 5000-9000 watts. Hanging clothes out to dry will obviously reduce power usage. For permanent press garments, a short cycle with no heat or air dry will tumble wrinkles out. Garments may then be air dried.

Conventional refrigerators (those with freezer and refrigerator space in the same compartment) require less power than frost free models. Keep the refrigerator defrosted. A frost build-up of more than ¼" acts as insulation and requires the refrigerator to run more. Refrigerators operate more efficiently if the condenser coils are kept clean. Regular vacuum dusting gives best results. A dollar bill can be used to check the seal. If it slips out when closed, replace the seal. A freezer requires the same care as a refrigerator.

To effect any substantial savings, family members must work together. A plan for use of electrical appliances will help each member contribute to the goal of reduction of energy usage.

*Instructor, School of Home Economics.

(from Page 12)

bits and a place to raise them are necessities along with some simple medical equipment available almost anywhere in the world.

With these minimal facilities, either available or promised, the formal beginning of the program took place in early January, 1973.

Armed with 22 antisera to different viruses obtained from investigators at Purdue University, North Carolina State University, Oregon State University and from stocks at the Uni-

(Continued on Page 16)

Author A. D. Day with left hand points to the ears on the Mexican June variety of corn standing tall in background. It is marketed as livestock feed. With his right hand he points to ears on Indian flower type corn. This demonstrates the shorter growth characteristics of the Indian corns which are grown for human consumption.

The Charm of . . .

INDIAN CORN

*by A. D. Day, R. K. Thompson & D. R. Grove**

Corn became adapted to semiarid regions on Indian reservations in the southwestern United States, as its cultivation spread throughout the world. Hopi and Papago Indians have been superior dry-land farmers who have retained corn as one of their most important foods. Corns grown on Indian reservations in Arizona differ greatly in appearance and growth characteristics.

Since 1958, a number of corn collections have been made on the Hopi and Papago Indian reservations in Arizona. Samples of flour, dent, flint, squaw, and sweet corn types were obtained. All collections were grown under irrigation at Mesa, Arizona, to produce seed for future studies and distribution. In 1967, seed of the same age of 20 representative corn selections from the collection were compared at Mesa, Arizona. They included 16 selections of the Indian flour and dent types (Arizona corn numbers 115-130) and 4 selections from the Mexican June Complex (Arizona corn numbers 131-134). Planting was on March 15, using a nested design with 4 replications. Two hundred seeds of each corn (50 seeds per replication) were planted in 7.6 m (25 ft.) rows with a 1 m (40 in.) spacing between rows. Seed spacing was 30.5 cm (12 in.) and depth of planting was 3.1 cm (1.2 in.) A total of 114 cm (45 in.) of water were applied as needed throughout the growing season. All plants were allowed to open-pollinate. The following data were collected from each plot: (a) average plant height, (b) average leaf length, (c) average leaf width, (d) average number of nodes in the main stalk of each plant, (e) number of plants, (f) number of stalks, (g) dry weight of six main stalks, (h) refractometer reading (% soluble solids), (i) grain yield, and (j) grain volume-weight. At the dough stage of kernel development, six main stalks were removed at the soil level from each plot and green weights recorded. Three of these stalks were separated, weighed green, oven-dried for 24 hours at 71.1 C and weighed dry for silage comparison. Leaves measured for leaf length and width were the first leaf above the first ear from the soil. At silage harvest, a refractometer reading was made for sugar content of the juice extracted from the first node below the top ear on the main stalk of one plant in each replication. Grain yield and volume-weight were obtained at maturity from the main stalk of six plants in each replication. Data were analyzed using the standard analysis of variance, and treatment means were compared using Duncan's multiple Range Test.

Seed Color

Seed color ranged from white, light red, dark red, amber, striped, to different color mixtures.

Type Classification

The older Indian types (numbers 115-130) were predominately flour types with some dents and flour-dent mixtures. The Mexican June Complex (numbers 131-134) were all white dents.

Maturity

The number of days from planting to maturity ranged from 99 to 142. Most Indian corns were much earlier than the Mexican June group.

**Agronomist, Research Associate in Agronomy and Plant Genetics, and former Graduate Student, Department of Agronomy and Plant Genetics, University of Arizona.* *Appreciation is expressed to the Bureau of Indian Affairs, U.S. Department of Interior, and the Arizona Cooperative Extension Service, U of A, for assisting with corn collections on Indian Reservations in Arizona.*

This is typical of an ear of the Indian flower type corn. It is used for human consumption. These corns were grown at the University of Arizona Campbell Avenue farm in Tucson.

Plant Height

Of the 20 selections, the Mexican June types were significantly taller than the 16 Indian corns.

Leaf Length and Width

In general, Indian flour corns and flour-dent mixtures had longer leaves than Indian dents and Mexican June selections. Indian dents and Mexican June dents had wider leaves than other types.

Nodes Per Stalk

Five dents, including the four Mexican Junes and one Indian type, had the most nodes per stalk. A positive relationship existed between node number and plant height.

Stalks Per Plant

Mexican June plants were single-stalked, while plants from the Indian corns were generally multi-stalked.

Forage Production

Dent corns of both Mexican June and Indian origin outyielded flours and flour-dent mixtures in dry forage production. Dent selections produced plants that were taller and with stalks of a larger diameter than other types.

Soluble Solids In Stalks

Indian selections were among those of highest and lowest soluble solids content and the Mexican Junes were intermediate.

Grain Yield

Selections differed significantly in grain yield. The top producer was an Indian dent, which also yielded high in silage and was in the top 25% in grain volume-weight. Other high yielding groups were Indian flour-dent mixtures, Indian dents, and a Mexican June type.

Grain Volume-Weight

Indian flour corns were among the highest and lowest in grain volume-weight. Mexican June types produced grain of intermediate volume-weight.

Future Potential

Seed of corns in the Arizona Corn Collection is available for distribution. Since Indian and Mexican June types are well adapted to environmental conditions in the semiarid southwestern United States and northwestern Mexico, they will be useful to corn breeders interested in developing silage and grain cultivars for the Southwest and regions having similar climatic conditions throughout the world.

Brazil . . .

(from Page 13)

versity of Arizona, investigation of virus diseases of Ceara was begun. Primary attention was focused on feijao-de-cordia (cowpea — *Vigna sinensis* Endl.). This important food crop of Ceara and all Brazil has long been afflicted by a serious mosaic virus disease which had gone unidentified and uncontrolled in Ceara. The first steps were collection of diseased cowpea tissue, extraction, purification and concentration in the laboratory. This material was analyzed on a spectrophotometer and then reacted serologically against 6 antisera that were each specific for a different virus that can infect cowpea. Twenty-four hours later we had our answer, the virus was the one commonly called cowpea mosaic virus. This virus is common on cowpea in the U.S. and various European countries but had not been reported from Ceara. With this information we then surveyed various parts of the State to study the epidemiology of the disease and specifically to locate the sources of the virus causing infection of cowpea. The aim, of course, was to determine a practical control measure. During these surveys several noncultivated plants were also found infected with cowpea mosaic; all were in the same family as cowpea (Leguminosae). Because of their wide distribution and year round growth habit avoidance or elimination of these wild virus host plants was deemed impractical. The inescapable conclusion reached was that the only practical control measure would be the development of resistant varieties. Screening various cowpea varieties for disease resistance was begun.

Many other plants were observed to have virus-like symptoms and several other viruses were identified from cultivated and wild plants. Squash mosaic virus was identified from squash and cucumber while tobacco etch was found in pepper. Judging from the large number of plants observed with virus-like symptoms it seems obvious that much time and effort will be required to identify and assess the importance to agriculture of the many virus diseases of plants in Ceara.

Rural & Urban Residents . . .

(from Page 7)

number and type of insecticides which were banned from use. The majority of respondents cited negligence by adults as the major factor in insecticide accidents involving children. Predictably, most of the rural group indicated that adults were most susceptible to poisoning in their community while most of the urban group cited infants as being most susceptible. In the former case, this is attributed to occupational hazards and in the latter to household accidents.

Farmers had more specialized sources of information regarding insecticides, i.e. retail dealers (25%), farm journals (22%), extension agents 22%) and extension leaflets (19%). Figure 2. The principal sources of information for homeowners were newspapers (57%) and TV (15%). It is noteworthy that TV was not listed by farmers and no urban respondent indicated extension agents as the principal source of information. It is possible to conclude that the rural group was generally more knowledgeable regarding pesticides than the urban group, at least in part, because of the type of information source.

Responses were correlated with personal characteristics of the respondents. The higher the level of education the more knowledgeable people were about insecticides and the more likely they were to view the issue objectively and rationally. Elderly people were more prone to misconceptions about insecticides.

The findings of the study have several implications for the Cooperative Extension Service and for educational agencies in general. The results suggest that agricultural extension has had little impact from a pesticide educational standpoint in the urban sector. With increasing urbanization, the need to intensify educational efforts in this area is obvious. Present channels of information should be critically evaluated in the light of these findings. The general lack of awareness of public medical facilities for treating insecticide poisoning suggest that the existence of these facilities should be properly advertised.

In conclusion, this study showed that for educational purposes regarding insecticides rural and urban audiences may be considered as distinct and separate. Differences between these audiences suggest different approaches to communication. In a largely urban society, public opposition to insecticide use may find legal expression detrimental to the interest of all concerned. Only through effective education and public relations can factual information be channeled into the decision making process of all groups of people.

PROGRESSIVE AGRICULTURE IN ARIZONA

to

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GERALD R. STAIRS, Dean