onions, lotus root, tree ears, and water chestnuts—never had been consumed by some respondents in China. Likewise, several traditional Chinese foods are not eaten by Chinese in our study area, despite their availability. Foods in this class include: bok choy, bean sprouts, bamboo shoots, lotus root, pea pods, tree ears, and water chestnuts.

Fruit. More apples and peaches are consumed in America than in China, while largest decreases are with lychee, mandarin orange, persimmon, pineapple, and watermelon. Again, decline in consumption of these foods cannot be attributed to availability because fresh, dried, and canned products are widely available at specialty shops within the study region. Examples of fruits consumed in nearly equal frequencies in China and America include banana, grape, honeydew melon, and orange. It is interesting to note that peaches—symbol of longevity in China—never had been consumed in China by at least two respondents. Furthermore, one respondent never had eaten lychees in China and four never had eaten persimmons—despite these fruits being especially associated with Chinese by Westerners—and at least 50 percent of our respondents never eat them in the United States, even though they are readily available.

Resulting questions

Our data illustrate several dietary trends in food behavior of Chinese immigrants to north-central California. First, some "characteristic" Chinese ethnic foods were not regularly consumed even in China, and such items continue to play inconsequential or nonexistent roles once the immigrant arrives in America. Second, some frequently eaten Chinese ethnic foods are readily abandoned after the consumer arrives in America, despite the availability of these foods in fresh or preserved forms.

An explanation for the first finding may lie in rapidly occurring dietary change within China, a pattern whereby Chinese food behavior once considered correct may no longer be so. The second finding may be due to considerations of cost and perceived food quality. Although all foods itemized on the questionnaire are available to respondents, some foods may be too expensive, or might be perceived as inferior in taste, texture, or quality. (Whether such perceived differences between foods in China and America are real or psychological remains an important area for future research in sensory evaluation.) After abandoning many Chinese ethnic foods, Chinese immigrants have turned to American foods or to items characteristic of other ethnic groups, as with tortillas.

When evaluating characteristic diets of ethnic minorities after immigration, three food-use categories emerge: increased frequency, decreased frequency, and constant frequency. Whereas our data are limited, we have shown that nontraditional foods play major dietary and nutritional roles in Chinese-American families. Thus our study raises several provocative questions that remain to be answered. For example: What factors determine whether or not an individual readily adopts nontraditional foods? Why have some immigrants steadily maintained ethnic-food consumption while other groups have quickly accepted a wide range of American food patterns? Why are some foods adopted quickly, others slowly?

The intriguing question of Asian immigrants' wide use of tortillas requires closer investigation. On the basis of regional origin, Chinese demographic and geographic factors cannot account for rapid acceptance after immigration to America, since no respondents were from northern China where flat, tortilla-like wheat cakes are prepared. We need to understand more about the changing social significance of food as perceived by Chinese in contemporary society, whether in China or in America.

We suggest that questions raised in our study call for further detailed work not only among Asian immigrants to America but among immigrants from other countries as well. Are there universal trends? Are there nutritional dangers for immigrants who eclectically adopt quick-snacking patterns of 20th-century America, especially for individuals or families unable to maintain their traditional food patterns because of cost or availability?

Preconceived notions about ethnic food behavior may be quite erroneous, and nutrition educators need to be sharply tuned to both minority and majority food behavior. Let us not be surprised when we counsel Asians who do not eat rice, Hispanics who do not eat tacos, or American Indians of California who have never eaten acorn-flour bread. We can be better nutrition educators when we examine what our clients *actually* eat.

Based on an article in the Journal of Nutrition Education, *Vol. 10, No. 3, July-Sept. 1978.*
Louis Evan Grivetti is Assistant Professor of Nutrition and Geography, UC, Davis, and Marie B. Paquette was Research Assistant, Department of Nutrition, UC, Davis.

Attitudes of farmers toward using crop residues as fuel

Clarence F. Becker ☐ Bryan M. Jenkins ☐ Brian Horsfield ☐ John R. Goss

Growers favor use of rice straw and prunings as sources of energy by utility companies, but only if the collection system is practical, timely, and reliable.

Agricultural residues—the renewable by-products of farming, lumber production, and food processing operations in the state—are now attractive alternative energy sources to oil and natural gas. Twenty-seven million tons of residue containing the equivalent energy of 65 million barrels of oil are produced each year in California. Utility power companies in California are especially interested in the potential for developing agricultural residues into a useful and stable fuel supply for electric power generation. This article deals principally with the attitudes of farmers toward the utilization of their crop residues by utilities for power generation.

In a recent study (August 1977), we explored with the Pacific Gas and Electric Company the economic and technical feasibility of using agricultural residues as fuel. We evaluated methods and costs for collecting, transporting, and converting residues, and found energy production from residues to be competitive with that from coal, provided that utilities can establish long-term contracts with farmers for the use of residues produced on farmers' lands. These long-term contracts are vital to both the utilities and the farmer—assuring the utilities of a firm fuel supply and the farmers of a firm market for residues. Because residues present significant disposal problems or costs to some farmers, the use of residues by the utilities will benefit not only the utilities but the farmers themselves. However, the use of residues for any purpose may affect the way some farmers are performing their field operations now. Therefore, to better understand how farmers feel about utilities using their residues as energy resources, especially if modification of existing practices should prove necessary, we contacted farmers and asked for their opinions and ideas.

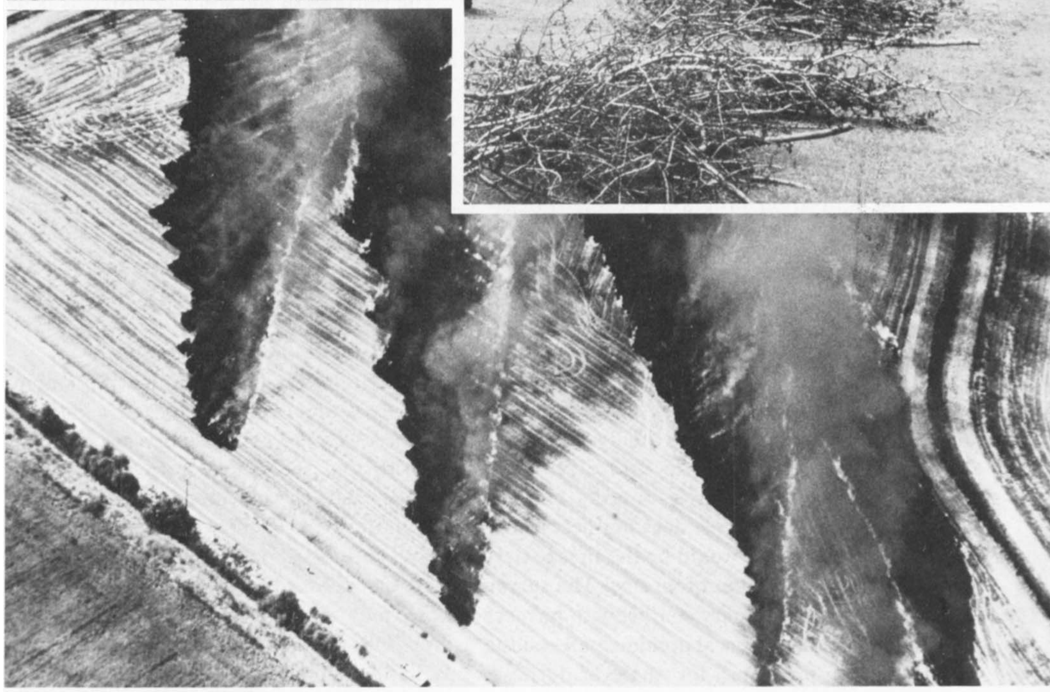
A survey, prepared by us at the Agricultural Engineering Department at UC, Davis, was mailed with the cooperation of farm advisors in Sutter, Colusa, and Fresno counties and the executive secretary of the Butte County Rice Growers Association. The surveys were mailed only to rice growers and orchardists, because rice straw and tree prunings were, at the time of the survey, the two residues with the highest initial potential for utilization in large central station power plants, and because modifications in present field practices may be needed to collect these residues.

Survey responses

All farmers contacted were willing to participate in a practical program for collecting and utilizing the residues. The word "practical" is often underscored: the collection system must be reliable under all weather and field conditions, and the market for the residue must be established before a utilization program can be substituted for burning. Farmers feel that such a disposal system has advantages over open-field burning, which has been the cause of increasing public concern.

We asked participating farmers to: (1) list their present residue disposal practices, (2) express their willingness to participate in a utilization program, (3) give their preferences on how they would participate, either by contracting with a custom operator to collect the residue or by delivering the residues to the power plant themselves, (4) discuss their requirements for a collection operation, including needs for storage space on their properties, speed and timing of the operation, economic returns from the utility to cover costs to the grower, and (5) predict any problems they anticipated for collection systems operating on their lands.






Prunings being buckraked for burning (upper left) outside of the rows where they had been placed (upper right). Open-field burning of straw (center), the most common technique for disposal of field residues in California, has elicited public concern over smoke pollution. Incorporating straw into soil, however, is expensive, can impede subsequent field operations, and is fraught with such difficulties as clogged plows (below).

Survey respondents are strongly in favor of having the residues collected by custom operations, primarily to save themselves time and effort, and secondarily because storing residues until pickup is a major concern. Residues will most likely be stored in roadside piles for one to several months. Most farmers contacted can provide the space for these piles, but would like not to be burdened with the management responsibilities caused by heavy rains on exposed piles; fires; strong winds scattering the residues; piles harboring diseases and pests; and esthetics of piles.

Timing of the residue collection operation is critical. Collection must not impede soil preparation, planting, harvest, chemical application, or other field practices. These factors must also be carefully considered in collection system design.

Farmers responding to the survey indicated that obtaining long-term commitments was more important than making a profit. But if the utilities are successful in this venture, farmers would, of course, like to receive a share of any profits. Some farmers fear that if they gave up open-field burning for even a short time, they might permanently lose this disposal method, even if the utilization program became unfeasible for any reason.

The number of conclusions that can be drawn from the survey are limited, for only rice growers and orchardists were involved. The attitudes of other farmers, including growers of cotton, cereal grains, other field crops, grapes, and vegetables, and operators of dairies and feedlots, are equally important to long-term attempts to utilize residues, and the selection of rice growers and orchardists for the survey does not necessarily indicate that these would be the first to participate in utilization programs. The survey was only a preliminary contact with farmers to discern their general opinions; all residue utilization programs, for whatever purpose, can only be initiated with the cooperation of the farmers. The positive response to the survey is encouraging for continuing research. By participating in utilization programs, farmers can develop new ways to dispose of residue and obtain a practical source of energy, while helping preserve our oil and natural gas.

Clarence F. Becker was Visiting Research Professor, Brian Horsfield was Assistant Professor, Bryan M. Jenkins is Graduate Student, and John R. Goss is Professor, Department of Agricultural Engineering, U.C., Davis.

The authors express their appreciation for the assistance received from several Extension specialists, farm advisors, others who provided valuable information during interviews, and growers who completed and returned the questionnaires. The investigation was supported in part by a grant received from the Pacific Gas and Electric Company.

Evaluation of insecticides for a grape IPM program

William L. Peacock □ Donald L. Flaherty
Marjorie A. Hoy □ Dennis J. Culver

The Pacific spider mite, *Tetranychus pacificus* McGregor, is a serious pest of grapes in the southern San Joaquin Valley, largely because some insecticides disrupt their natural control. Currently, when new insecticides are registered for the control of insect pest populations, little information is given, or known, about their effects on beneficial predator or parasite populations. If an insecticide is to be successfully incorporated into an integrated pest management (IPM) program for grapes, its effects on non-target beneficials must be known.

The purpose of the work in progress is to evaluate materials that have been registered or could be registered for use in vineyards, with emphasis on the effect that these materials have on spider mite population ecology. This report is the result of vineyard and laboratory studies with methomyl, recently registered for use on grapes, and permethrin, a synthetic pyrethroid not now registered for use on grapes. The target pests in the study were the grape leafhopper, *Erythroneura elegantula* Osb., and the grape leaf folder, *Desmia funeralis* Hbn.

Populations of Pacific mite, Willamette mite *(Eotetranychus willamette* Ewing), the predaceous mite *(Metaseiulus occidentalis* Nesbitt) and the tydeid mite *(Pronematus anconai* Baker) were monitored. Moderate populations of Pacific mite result in leaf burn, stunted shoots, and damage to the fruit by exposure to the sun. High populations may result in serious crop losses or even kill grapevines. On the other hand, Willamette mite has been overrated as a pest of grapes in the southern San Joaquin Valley. Studies have shown that high populations can be tolerated without risking yield and quality losses in wine, raisin, and table grape vineyards. Willamette mite is a beneficial species in that it serves as an alternate food source for predaceous mites; thus, its presence enhances control of the more serious Pacific mite. Tydeid mite has also been found to be an important alternate food source for predaceous mites. Tydeids are not a pest of grapevines. They feed primarily on windblown pollen and only secondarily on grape foliage.

Vineyard trials were established in 1976 near Dinuba and Exeter in Tulare County on Thompson Seedless and Emperor grape varieties, respectively. Both experiments were designed as randomized complete blocks with four blocks and twelve vine plots. Treatments in Dinuba were: (1) check, (2) methomyl (.75 pound ai per acre), (3) permethrin (.025 pound ai per acre), (4) permethrin (.050 pound ai per acre). Treatments in Exeter were: (1) check, (2) permethrin (.1 pound ai per acre), and (3) permethrin (.2 pound ai per acre). Materials were applied with a dilute sprayer using 200 gallons per acre on July 19 at Exeter and July 23 at Dinuba.

Grape leafhopper populations were monitored by counting leafhopper nymphs on ten leaves per plot. Basal leaves were selected for first generation counts and mid-cane leaves for second and third generation counts. At Exeter, grape leaf folder activity was measured on August 2 by counting rolls on six half-vines per plot. Spider mite populations were monitored by sampling ten leaves per plot weekly. Leaves were randomly taken from the vine tops at Dinuba, where Pacific mite predominated, and from northern vine sides at Exeter, where Willamette was present but not Pacific mite. Leaves were placed under refrigeration until counting with a dissecting scope. Adults,

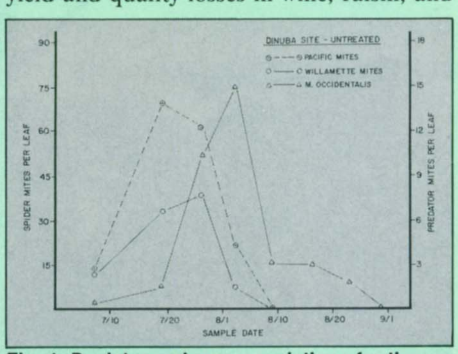


Fig. 1. Predator and prey populations for the untreated plots at the Dinuba Thompson Seedless vineyard.

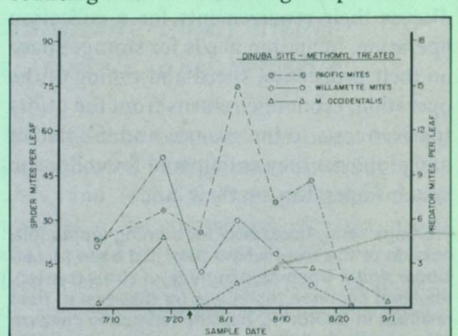


Fig. 2. Predator and prey populations for the methomyl treatment applied July 23 at the Dinuba Thompson Seedless vineyard.