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comment

Director John R. Davis

The end of a beautiful friendship?

In 1887, the Hatch Act was passed by the U.S. Congress to provide a permanent partnership for the support of agricultural research in both federal agencies and in Land-Grant universities. Funds were appropriated annually in USDA through the Cooperative State Research Service (CSRS) on a formula basis to each Agricultural Experiment Station in each Land-Grant university. When mixed with state-appropriated funds, these Hatch Act appropriations provided an opportunity to conduct research on problems of local, regional and national importance.

Over time, we developed a good relationship with CSRS—its administrators and its staff of competent scientists. CSRS provided a system for research reporting and information retrieval, a program of critical research reviews and examinations and a Washington, D.C. advocacy for the need and value of agricultural research. It provoked a productive system of regionalizing research activities and planning research programs. This regional effort encouraged collaboration with other related agencies, such as Soil Conservation Service, Bureau of Reclamation, U.S. Forest Service, U.S. Fish and Wildlife Service, Bureau of Land Management, Bureau of Indian Affairs and with agriculturally related industries.

In almost every way, our association with CSRS was mutually satisfying, efficient, effective and, as far as Oregon was concerned, very rewarding. It was a beautiful friendship—some even called it a marriage. By any definition, it was an outstanding example of productive federal-state relations.

But lately, I think that I've been receiving "Dear John" letters telling me the beautiful friendship between Land-Grant universities and USDA may be a thing of the past. Let me give you several examples.

For the third year, USDA has projected Hatch funds with no inflation or salary increases. With inflation increasing at a rate of about seven percent per year, this means that USDA has reduced the purchasing power of Hatch funds by almost 25 percent in the last three years. If all federal agencies received the same treatment, I could understand and accept this reduction. But funds for support of state programs in agriculture are essentially the only programs reduced in this manner.

Secondly, virtually all new programs administered by CSRS are funded through the mechanism of competitive grants. These programs require detailed proposals from scientists located at any institution in the country and only in those research areas selected by USDA. To a degree, competitive grant programs are appropriate. But these have been developed at the expense of Hatch formula funding. This says to me that USDA will no longer rely on the Land-Grant system for agricultural research—funds allocated for immediate research needs in the states on a formula-funded basis might now be used for basic research programs in any institution in the U.S., that can write a competitive grant proposals

Then, when the dirty jobs need to be done, such as the pesticide impact assessment program and minor crop uses of pesticides, the Land-Grant system is asked to conduct the research. Indeed, we do respond to these requests, but it is because the agricultural industry of the state needs the results of that work—certainly not for the money or the glory. Often, our faculty are out in the field doing this dirty work when other institutions are busy writing grant proposals.

The effect of these changes over a period of time may be disastrous for U.S. agriculture. Because USDA is not supporting cost-of-living increases in formula funding, the Agricultural Experiment Station in Oregon already must reduce research programs by about $100,000 each year. Programs that serve only a small number of growers, therefore, may be eliminated, even though the impact could substantially affect small agricultural industries. Long-range research relative to Oregon's needs will be reduced, which means Agricultural Experiment Station scientists may deal more and more with only today's problems and less and less with anticipating tomorrow's problems.

CSRS was recently a part of a reorganization of USDA research, so

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that CSRS is now Cooperative Research (CR), a part of the new Science and Education Administration (SEA), in USDA. Perhaps, with time, this new bureaucracy will rekindle the old friendship, but I doubt it. The new bureaucracy simply has added staff in Washington and, with little influence with the Secretary of Agriculture, it has not been an effective organization. Some of our colleagues in USDA who recall the good old days when appropriations were used for productive research certainly must also be discouraged with this latest turn of events.

Agricultural research programs are a miniscule part of the federal-state picture but if recent trends are symptomatic, it is obvious that the Land-Grant philosophy of solving local problems and supporting a productive agricultural economy, is being rejected by the current administration. The once-productive relationship between the Land-Grant university and the USDA is rapidly crumbling, and we are heading for trouble.

USDA needs to understand the value of this friendship before it is too late. Already the burden on each state to support the federal share of research is becoming too great. I don't have the answers to this weakened friendship, but I don't like what I see because it forecasts a weakened agriculture and weaker Land-Grant universities. Perhaps some of the "Dear John" letters should be balanced with more "Dear Jimmy" letters. After all, government is supposed to be "*for* the people."

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Tansy talks explain human hazards

Pyrrolizidine alkaloids are killers.

In tansy ragwort, they cause death to cattle and horses. The battle between farmers and tansy ragwort has been well publicized.

But few people know that pyrrolizidine alkaloids are found in dozens of other plants in addition to tansy ragwort and that humans are just as susceptible to poisoning as some animals.

"A single dose of pyrrolizidine alkaloids can cause irreversible consequences, changes that may get worse over time," said Peter Cheeke, animal nutritionist at Oregon State University.

Cheeke organized a symposium at OSU in February on tansy ragwort and pyrrolizidine alkaloid poisoning from other sources. Authorities from throughout the U. S. presented research findings to other scientists and the general public during the two-day symposium and confirmed the seriousness of the pyrrolizidine problem.

Many of the reports dealt with studies of tansy ragwort and animal health, but discussions of poisoning from other pyrrolizidine alkaloid sources sounded alarms for human health, too.

"In Afghanistan in 1976 there was an outbreak of poisoning related to a field of wheat contaminated with crotalaria, a source containing pyrrolizidine alkaloids. More than 1,600 people got sick and many died. Then, a short time later in India, there was another incidence of wheat contamination. Sixty-seven people were reported sick and another 28 persons died," Cheeke said.

Those two examples were presented by R. J. Huxtable of the University of Arizona Department of Pharmacology. Huxtable also related a problem of poisoning closer to home.

The Arizona researcher said that in his state, several children of Mexican-American families had been treated for some time for what appeared to be hepatitus or severe liver damage. Doctors could not explain the illness. The children's parents were questioned, however, and researchers found that the stricken children had been given a tea called gordolobo yerba as a cure for cold symptoms. Samples

of the tea revealed leaves of a plant named Senecio longilobus. The plant contains 20 times as much pyrrolizidine alkaloid as tansy ragwort.

The problem was one of misidentification in the case of gordolobo yerba tea. The traditional plant used for the herb tea looks almost identical to the one containing the deadly alkaloid. And because herbs are not considered as either food or drugs, no regulations require certification of purity.

"In this case, the alkaloids have a unique way of getting into the human food supply," said Cheeke. "Gordolobo yerba tea is marketed in health food stores and some pharmacies throughout the Western U.S. A single cup could be a lethal dose and very much lower levels could cause liver damage that might not show up for many, many years."

But misidentification is not the problem in comfrey, another plant that has been widely used for human tea and animal feed. Cheeke said studies show that comfrey contains about one-third as much pyrrolizidine alkaloid as tansy ragwort.

"More research is needed on comfrey. Even the Henry Doubleday Association in England, which has long advocated the growing of comfrey around the world, now issues a warning on the cover of their book about comfrey saying that comfrey contains pyrrolizidine alkaloids," Cheeke said.

Other potential sources of human exposure to pyrrolizidine alkaloids discussed at the symposium included tansy ragwort contamination of honey and milk. Max Deinzer of OSU's Department of Agricultural Chemistry said studies of honey produced when bees pollinated tansy ragwort plants showed that honey was off-color and appeared unpalatable. Dairy cows fed tansy ragwort likely would become sick or die after eating much of the weed, but some alkaloids could be passed through their milk until symptoms appeared.

Deinzer said more research is needed on both these sources of potential human contamination because any amount of pyrrolozidine alkaloids can be metabolized in the liver and have irreversible effects on the liver and other vital organs.

"Low concentrations of these alkaloids still are palatable and may produce toxic effects or cancer years after ingestion because these chemicals are carcinogenic and accumulative. We do not know whether milk or honey contaminated with pyrrolizidine alkaloids at any level can be considered safe," Deinzer said.

Problems also could arise from alkaloids in goat's milk.

Many people believe that goats, like sheep, can eat tansy ragwort and even clear pastures of tansy, without suffering any ill health. Research at OSU by Cheeke and graduate student Doug Goeger has shown that indeed goats are quite resistant to tansy. Some animals were fed up to four times their body weight in tansy ragwort over a period of a year. However, one goat died with severe liver lesions typical of tansy poisoning. At Washington State University, John Dickinson administered large amounts of tansy to lactating goats equipped with rumen fistulas. He detected alkaloids in the milk of these goats. After the conclusion of the study, the goats were bred and maintained on a normal diet. But when the does were ready to give birth, they died. They had developed liver damage typical of tansy poisoning, which did not cause them problems until the stress of giving birth.

"People living on small, 'back to the land' sorts of farms are most likely to have problems because of tansy ragwort in goat's milk. Goats can eat a lot of tansy, but they are not totally resistant as was theorized in the past. We were especially interested by the fact that the goats wouldn't eat a diet containing more than 25 percent tansy. Sheep will eat a diet of 50 percent tansy. It blows the old theory that a goat will eat anything," Cheeke said.

Other presentations at the symposium included reports of research on why sheep resist tansy poisoning while other farm animals succumb. OSU graduate student Robert Swick said no evidence of detoxification of tansy alkaloids in the rumen of sheep has been found, so liver metabolism is being investigated. A. Morrie Craig, School of Veterinary Medicine, OSU, said that based on a newly developed blood enzyme analysis, horses and cattle fed 10 percent of their body weight in tansy showed irreversible damage to the liver that lead to death. These tests were developed to help veterinarians diagnose tansy poisoning sooner, however, sheep fed 200 percent of their body weight in tansy showed no effects by this enzyme test or by histopathology. And Q. R. Rogers of the School of Veterinary Medicine at the University of California at Davis discussed a proposed method of diagnosis and treatment of tansy poisoning in horses using amino acid therapy.

Cattle toxicity to tansy was discussed by Earl Johnson of USDA's Poisonous Plants Laboratory in Logan, Utah. Studies at the lab indicate that when cattle consume from one to five percent of their body weight in tansy, they will die. And a small amount of tansy over a long time can be just as deadly as a larger amount eaten quickly.

Scientists also discussed methods for detecting tansy ragwort and control with chemical and biological agents.

Results of the proceedings will be published by the Nutrition Research Institute at OSU, which sponsored the symposium.

Sky spy eyes ragwort spread

Tansy ragwort is an expensive enemy.

Cattle ranchers and horse owners whose animals die from tansy poisoning have tangible evidence of the weed's destructive power. But it also costs in less obvious ways—to a farmer who loses otherwise productive land to tansy plants or to a forester who loses the goodwill of farming neighbors because of inadequate control measures.

Dennis Isaacson, former noxious weed control officer for the Oregon Department of Agriculture and now with the Environmental Remote Sensing Applications Laboratory at OSU, said a demonstration project concluded last summer helped assess the tansy problem in Oregon.

"Lack of information on economic losses has hurt control. It's hard to give ragwort a priority with no hard evidence," Isaacson said.

In 1975, the Oregon Legislature passed a bill to support tansy ragwort control. The bill was funded by the Legislative Emergency Board in November that year. But Isaacson said estimates of tansy infestation were unrealistic in many areas and, in some cases, hurt the control effort.

"It had been estimated that nine of the 16 million acres in western Oregon were infested with ragwort," he said. "This demonstration study was aimed at finding an objective way to view the problem and estimate the amount of ragwort."

Satellite scanning of all western Oregon counties except Jackson and Josephine was the main thrust of the project, sponsored by the Pacific Northwest Regional Commission and the National Aeronautics and Space Administration.

Images recorded from the satellite helped researchers classify the counties into eight land-use categories including forestry, agricultural and miscellaneous uses. Aerial photographs then gave researchers a close-up view of tansy plants, and visits to selected plots provided confirmation of the sightings.

When all the puzzle pieces were assembled, the researchers had an overview of tansy distribution and an inventory of critical land categories where loss to tansy infestation is most critical.

Lack of information on economic losses has hurt control.

Estimate of forage lost to tansy: $600,000 each year.

"There was a broad mix," said Isaacson. "Some areas were much worse than others. For instance, Tillamook County, which has had an active tansy ragwort control program for many years, still has one of the worst infestations. But the problem is not related to the control program as much as to the agricultural uses and types of crops."

In areas where annual crops are grown, tilling keeps tansy from growing, he said. But on dairy pastures in Tillamook County, tilling is less frequent and tansy has more opportunity to invade.

Overall, dry pastures were identified as the most critical loss areas. Isaacson said with slightly more than 500,000 acres of dry pasture in western Oregon, a conservative estimate of desirable forage lost to tansy displacement each year is $600,000, not including losses of animals from poisoning.

This realization of cost can help officials from the Oregon Department of Agriculture do a better job of assessing the tansy problem and coordinating control, he said.

"Land use plays a big part in whether tansy should be treated with cultural, chemical or insect methods. On land where tansy does not present a big problem, an intensive chemical investment is not justified," Isaacson said.

New test tells toxin tale

A cheaper, simpler method for detecting staphylococcal enterotoxin, cause of one of the most common types of food poisoning, has been developed at Oregon State University's Department of Foods and Nutrition.

The method is EMIT (enzyme multiplied immunoassay technique). Margy Woodburn, head of the department at OSU, and T. N. Morita, research associate, developed EMIT—a method all health departments could use easily. EMIT is similar to the ELISA method used to detect viruses in plants and animals. Applications of the ELISA method were reported in the summer and fall 1978 issues of *Oregon's Agricultural Progress*.

No one knows the extent of food poisoning, according to Woodburn, with millions of cases apparently going unreported annually in the United States. Of the cases reported, many are not specifically identified, she said.

"In Oregon, one reason cases were not identified was because health departments don't have the equipment or the trained personnel to do the standard radioimmunoassay method for detecting and identifying the causative agent," Woodburn said.

EMIT requires no special equipment or training of technicians.

"This is good," she said. "Counties that have small laboratories can now detect food poisoning. The EMIT method is cheaper and simpler to run than the radioimmunoassay method."

Victims have tended to dismiss staphylococcal intoxication, or food poisoning, as the 24-hour flu. Symptoms of staph food poisoning

are diarrhea, nausea and vomiting, but fever is not a symptom of staph, she explained.

"Since the extent of staph food poisoning never has been identified, we don't know how large the problem is. Prevention of future problems with the bacteria are thus stressed too little," said Woodburn.

Food poisoning is the result of poor handling of food and in a typical situation, most of the family may be ill but no one reports it. The family members assume they have just had a virus, said Woodburn.

"If the food had been kept hot (above 140 degrees Fahrenheit) or cold (below 40 degrees Fahrenheit), the illness could have been prevented," she said.

EMIT has been around for a while, according to Woodburn, but no one had adapted it to enterotoxins, poisonous substances produced by *Staphylococcus aureus*. A sample of the discarded food generally is used for the test; however, excreta, if collected during an acute phase of the illness, also can be used.

The process works like this: A purified enterotoxin which has been produced by the staph organism is attached, by means of a chemical reaction to amylase, an enzyme that breaks down carbohydrates. The food sample and a measured amount of antibodies (which neutralize the toxin) are combined first and then the amylase-enterotoxin conjugate is added. Amylase is inactivated when the amylase-enterotoxin conjugate links with an antibody, Woodburn explained.

Therefore, the more amylase activity remaining, the fewer free antibodies are present. The amylase activity is measured by the amount of starch broken down in a following reaction, she said.

EMIT could detect staph toxin in levels as low as five nanograms a milliliter, said Woodburn. A nanogram is so small that it equals 1×10^{-9} grams (28.35 billion nanograms equal one ounce).

"Thus in a serving of food which equals about 3 1/2 ounces, any detectable level will cause illness," Woodburn said.

The whole EMIT procedure can be done in about two hours, although each sample has a 12-hour holding period.

Funds from the Oregon Agricultural Experiment Station financed development of the method for one of the five types of enterotoxin. Woodburn and Morita have applied for a two-year grant from the National Institutes of Health to expand their study. They want to try to detect other enterotoxins with the EMIT method.

Said Woodburn, "With the publlication of our paper on EMIT, other researchers may pick up the idea and start perfecting the method. Soon it should be widely available."

Bare-roots: success at ground level

Success is a word seldom used by scientists. But Les Fuchigami, OSU horticulturist, uses it without qualification to describe a project on bare-rooting of conifers and broad-leaf evergreen shrubs.

What is bare-rooting and why is Fuchigami so enthusiastic?

Basically, bare-rooting is a horticultural method that short-cuts the time and expense of traditional tree and shrub handling. Bare-rooting is used widely in the production of deciduous trees and the success of bare-rooting in conifers and shrubs may mean that commercial production of evergreen plants in Oregon will boom similar to the commercial production of deciduous nursery stock.

With traditional methods, conifers and shrubs are grown in the ground until they reach their desired size.

Soon, coniferous trees and shrubs may be grown and transplanted as easily as deciduous trees. OSU groundskeeper James Vandecoevering places a bare-rooted deciduous tree into its new home.

Then workers dig up the plant and wrap the root ball in burlap—a process known as balling and burlapping.

"But this method is slow and requires costly, time-consuming skilled labor or expensive equipment," said Fuchigami. "The nursery operators and landscapers just can't find the labor force to do the work."

Other disadvantages of balling and burlapping: high shipping costs because of the weight of the root ball, loss of valuable soil and the threat of diseases, weeds and pests being transported in the soil.

Bare-rooting circumvents those problems. When trees and shrubs are pulled from the soil, dirt is shaken off and washed away. Then the plants are put in sawdust or another artificial medium where the roots will regenerate. Plants are put into containers with a light-weight artificial medium before marketing.

During the OSU study sponsored by Weyerhaeuser Company, the Oregon Association of Nurserymen and the Agricultural Experiment Station, Fuchigami tested Colorado spruce, Hondo spruce, Noble fir, Oregon grape, laurel and rhododendron. Plants ranged in age from four to eight years. They were dug up with a shovel, with 12 to 18 inches of root system left and most of the soil was removed by vigorous shaking. They were watered and transported to the Portland area from Corvallis when the remaining soil was washed off, roots were pruned and the plants were put in sawdust beds.

Fuchigami and Ray McNeilan, Extension agent, and F. W. Moeller, technician, studied the plants at specific time periods. They measured growth and compared the length of pruned roots to the regenerated root system. Their most important finding was that there are certain times of the year when rooting will be more successful.

Although 95 percent of the plants were rooted successfully, hot summer months from early July to early September and an early spring period from January to the beginning of new spring growth were identified as the best times for root regeneration. The researchers found that physiological condition, age and stage of plant development played a role in regenerating success as well as the environment into which the plants were placed.

A soil temperature of approximately 70 degrees Fahrenheit, high light intensity and good soil aeration were identified as important factors in rooting success. Fuchigami said to root plants in early spring, growers may need to place heat coils beneath the sawdust or rooting medium, then use water in the summer to keep the roots damp.

"Generally, we found the older the plant is, the less root regeneration potential it has and the greater the risk of transplanting," Fuchigami said. Plants from one to eight years of age can be bare-rooted.

Yet plants with regenerated roots have more fiberous and plentiful roots than those grown in the traditional ball and burlap method, insuring greater growing success when the plant is put into a permanent location.

"Foresters are interested in the method because all the roots and a knowledge of the environment and physiological condition of the plant required for maximum rooting potential will insure better transplanting of young trees," Fuchigami said.

Eventually, the OSU horticulturist predicted, the bare-rooting method will changes entirely the way coniferous trees and evergreen shrubs are grown.

"Spacing arrangements in nurseries will be changed. Trees and shrubs will be grown in narrower, more compact space and machines used to pull deciduous nursery stock may even be modified for evergreens," Fuchigami said.

Oregon is the nation's leader in the production of deciduous nursery stock. More than 80 percent of the nursery stock grown in the nation comes from Oregon and 90 percent of the trees grown here are sent east of the Mississippi River, most to Northeastern states. The deciduous nursery industry is valued at $20 million annually.

Fuchigami expects an equally bright future for coniferous trees and evergreen shrubs grown with the bare-rooting technique.

And that's quite a success story.

Keep it clean

Stores struggling

At the grocery store, you wait for the checker to give a refund for your empty bottles and cans. You had noticed one or two had a bit of mold in the bottom but you shrugged and put them in a box anyway.

The checker looks a little pale. She sneezes and says she thinks she might be coming down with a cold. As she turns to the next customer, you say you hope she feels better.

These are examples of store sanitation and food handling problems that could be found in almost every grocery store. And according to one Oregon State University researcher, managers and owners of the stores, along with the other people who work and shop there, need to learn more about how serious these and other problems can be.

Jane Wyatt, associate professor of food science and technology at OSU, recently surveyed the concerns, experiences, attitudes and practices of 219 food market managers regarding store sanitation and safe food handling. She wanted to know what the managers and owners knew about sanitation procedures, sanitation principles and food protection and safety. She found that the 109 persons who responded to the survey—a representative sample of about five percent of the state's grocers—need to know more about store sanitation and safe food handling.

Almost three-quarters of the owners and managers believed their knowledge of sanitation was adequate. Eighty-two percent said they had established a routine sanitation procedure that was being followed by employees and felt they were doing a good or very good job. Only 2.8 percent of those who responded felt they were not doing a good job.

Wyatt cross-checked that knowledge, however, by asking a battery of questions designed to obtain information about the specific knowledge of food retailers on sanitation and safe food handling. Through those questions, she identified the weaknesses in knowledge.

"We found good agreement on the subject matter questions dealing with simple elementary statements about conditions for bacteria growth, but only about one-third of the respondents knew or understood more specific facts about bacteria such as how they can be transported and the basic principles of food contamination," Wyatt said.

A relatively high percentage of 77.8 recognized bacteria growth can be controlled by keeping foods cold, but when Wyatt posed a question that dealt with the specific temperatures needed to control growth, respondents were uncertain.

"One question dealt with the temperature of frozen foods. We made the statement that 'frozen food should be held at 10 degrees Fahrenheit or below' and 75 percent of those surveyed agreed with that statement. This is very interesting because the Oregon sanitary code requires that frozen foods be held at 0 degrees or below. A temperature of 10 degrees would be unacceptable."

A statement meant to gauge the knowledge of store cleanliness also produced an interesting response, the researcher said. Nearly 65 percent agreed that food contact surfaces could not be adequately cleaned without sanitizers. Concurrently, slightly more than 30 percent either disagreed or strongly agreed with the statement.

"I think this statement reflected a common reliance on chemical sanitizers and reflects a belief in 'the magic of chemicals,' " Wyatt said.

Grocers complain that returnable beverage containers are the biggest sanitation problem in their stores.

"The fact that food contact surfaces must be cleaned before sanitizers are applied is not reflected as a practice by the respondents."

The grocers also were asked to rank the potential public health risk of several situations. Again, the results produced some surprises:

—Only 51.9 percent said a sick employee ranked as a potential public health hazard. "This is a much lower response than is acceptable," Wyatt said.

—Food stored at 120 degrees was recognized by 55.6 percent as a danger zone where harmful organisms could thrive, but a significant portion of those surveyed did not readily recognize the dangers of holding a food at that temperature.

—Storing meat, fish and poultry in the same cooler room offers an excellent opportunity for cross contamination. "This practice should not be tolerated under any circumstances and I would have thought it would receive an overwhelming response as a public health risk," Wyatt said. "In fact, the response was almost the opposite with 59.9 percent ranking it as a low risk."

—Smoking and eating by employees in food preparation areas are prohibited by law because they pose a threat to food contamination and food protection, yet only 7.4 percent ranked it as a serious public health hazard.

—Cracks in floors and walls provide places for insects to harbor and filth and mold to accumulate. If the surfaces are kept clean, they should be regarded as a moderate health risk. Again, Wyatt was surprised to learn that more than 70 percent assigned it the low risk category.

Grocers did correctly identify, however, the low risk of discolored meats and broken cartons of dry food. Some confusion existed on the risk of products with expired pull date labels, but only 7.4 percent of the respondents regarded them as a high risk problem.

One reason frequently cited for the lack of training in sanitation and safe food handling is the common assumption that people who work in grocery stores do not stay on a job very long.

"In fact, a turnover rate of 100 percent often is quoted," Wyatt said.

Yet 74 percent of those persons who responded to Wyatt's survey had worked in food stores longer than 10 years.

"This may not be such a notable fact because more than 80 percent were managers and owners, but it could be that maybe individuals change jobs or go to work for other companies in the food industry. It seems from the survey data that a large percentage stay within the food retailing industry, so the value of training has great merit."

More than three-fourths of those surveyed agreed that more training is needed at all levels. A majority (65 percent) said their training had been on the job. No other source of training was identified by a majority of those polled.

"I do not believe the training can be done by the industry itself, however," Wyatt said. "It is my conviction that the industry is not equipped to handle the training because it lacks the knowledge and that the job is not conducive to learning. Job assignments and the time requirements of keeping a store in operation would detract from training."

Yet the grocers are reluctant to further involve government in training because they fear increased regulation of the industry.

"But, even though they expressed the concerns about increased regulation, 65 percent didn't know about the proposed federal sanitation ordinance about to be introduced by FDA," Watt said. "It will require some serious changes in many stores."

And what about the other side of the counter? What do grocers observe about their customers?

"A frequent comment was that the public does not exercise good personal hygiene and many persons bring disease, filth and dirt into the store. Grocers observe customers opening food cartons, misplacing items in the store and eating bulk displayed foods.

"But the factor most consistently discussed has to do with the insanitary conditions created by returned soft drink and beer containers. According to the grocers, handling of the container by clerks and holding them in stores until the distributors can pick them up creates the most serious public health hazard," Wyatt said.

Results of the study soon will be published in the Journal of Food Protection.

Tasters hop on OSU beer panel

The taste and aroma of European beer bring 20 staff members to the OSU food science building four days a week to taste beer.

Researchers want to find out what elusive ingredients make European hops so special that U.S. brewers import more than 10 million pounds of hops each year. If the ingredients can be identified, hop breeders can develop new varieties to be grown here that will give U.S. growers a bigger share of the market.

Ron Wrolstad, Lois McGill and Victoria Vladimoroff, OSU food scientists, are working with agricultural chemists Max Deinzer and Val Peacock to identify and test the ingredients.

The job begins when the chemists use a mass spectrometer to identify the more than 200 flavor components in beer.

"But only a few of those flavor components are derived from hops," Peacock said.

When the flavor components have been identified, they can be systematically added to the beer tasted by panelists. Each day, panelists taste three six-ounce glasses of beer.

"Ideally, the panel will be able to tell which hops a beer was brewed with," said Wrolstad. "Then they will be asked to tell the difference between a beer we added the flavor component to and a beer brewed with European hops. When they can't tell the difference, we may have found what we're looking for."

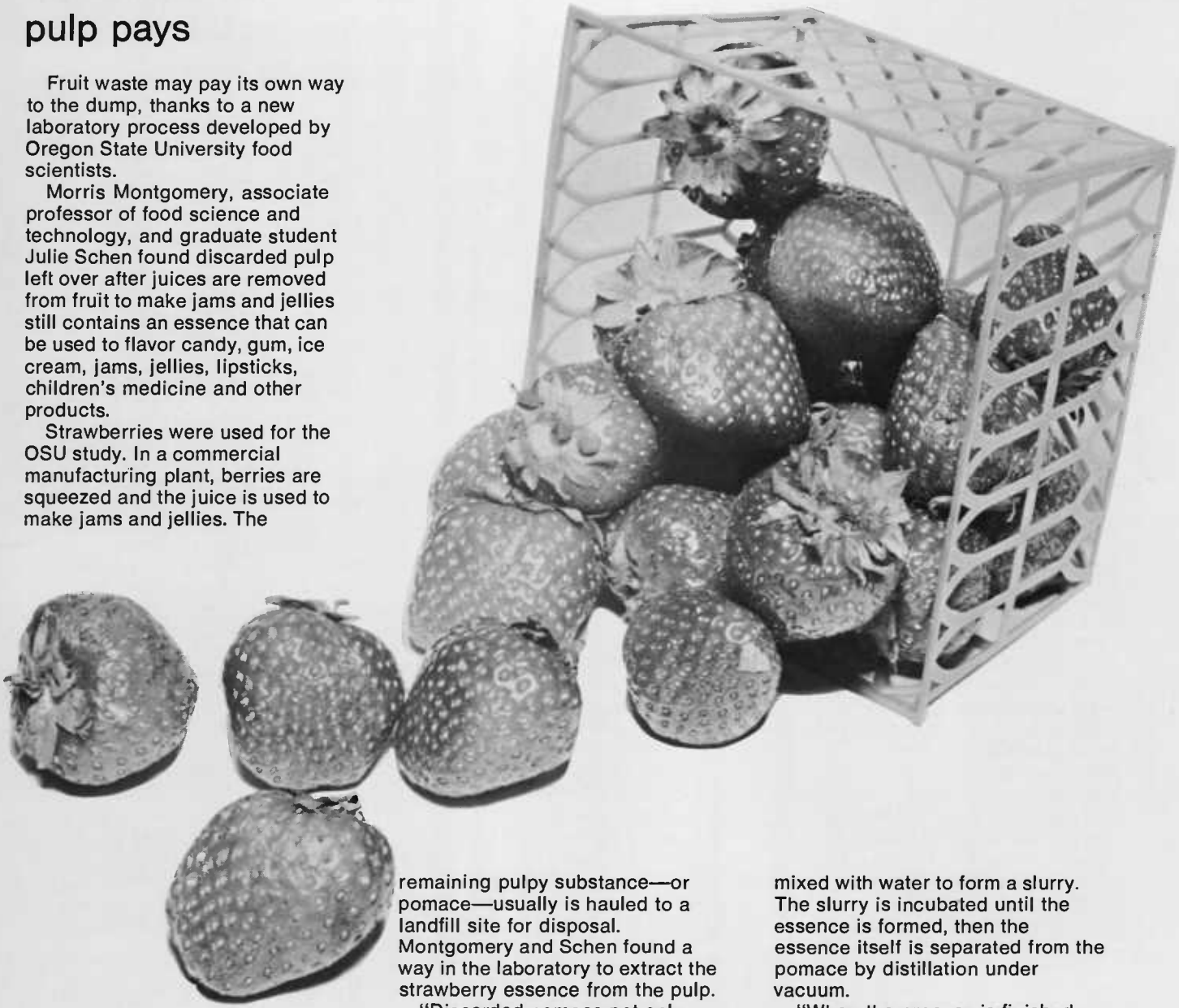
USDA hop breeders at OSU already have had some success. Three new hop varieties already have led to cuts in hop imports by Coors and Anheuser-Busch. But U.S. hop growers would like to see even more American beer brewed with hops grown at home. With help from the beer tasters at OSU, they may get their wish.

The essence: pulp pays

Fruit waste may pay its own way to the dump, thanks to a new laboratory process developed by Oregon State University food scientists.

Morris Montgomery, associate professor of food science and technology, and graduate student Julie Schen found discarded pulp left over after juices are removed from fruit to make jams and jellies still contains an essence that can be used to flavor candy, gum, ice cream, jams, jellies, lipsticks, children's medicine and other products.

Strawberries were used for the OSU study. In a commercial manufacturing plant, berries are squeezed and the juice is used to make jams and jellies. The remaining pulpy substance—or pomace—usually is hauled to a landfill site for disposal. Montgomery and Schen found a way in the laboratory to extract the strawberry essence from the pulp.



"Discarded pomace not only wastes raw material but it also costs processors to dispose of it," Montgomery said. "With this new process, the extra flavoring essence recovered from the pulp can pay the disposal costs for what is eventually left over."

The recovery process has three principal steps. First, the pomace is mixed with water to form a slurry. The slurry is incubated until the essence is formed, then the essence itself is separated from the pomace by distillation under vacuum.

"When the process is finished, the manufacturer still has to haul about the same amount of material to the dump, but the recovered essence will pay for the cost of disposal," Montgomery said.

The Agricultural Experiment Station researcher said the same process probably will work with other types of fruit, too.

Split cherries are the pits

Early summer showers can mean financial doom for Oregon cherry growers.

Rains in late June and early July can cause nearly ripe cherries to absorb water quickly, swell and split. And split cherries are worthless to growers.

In the past, growers have spent thousands of dollars renting helicopters to blow rainwater off their fruit. But now, researchers at Oregon State University are studying an alternative.

Horticulturists Garvin Crabtree and Melvin Westwood are testing anti-transpirants which could be included in pre-harvest sprays for cherries. The emulsified wax, sprayed on the fruit, hardens to form a protective coating that keeps the fruit from absorbing water. Last year, Crabtree and Westwood tested three anti-transpirants on three varieties of cherries twice near the harvest season.

Anti-transpirants do not affect the taste or texture of cherries and, if the waxy coating is not too thick, it is not apparent after the brining process. Robert Cain, professor of food science and technology at OSU, studied the cherries after brining. Most of the cherries grown in Oregon are brined and later processed as glace or maraschino cherries.

The only problem last year was lack of rain during the critical period before harvest.

"We're not prepared to make a statement on whether the anti-transpirant provides control because we simply don't have enough data," said Cain. "Last year was not a very good test year—good for the growers, but bad for the experimenters."

Laboratory crack tests were conducted, however, and results look promising.

Studies will continue at OSU this year. Research is sponsored by the Regional Sweet Cherry Commission and the Agricultural Experiment Station. If the process appears successful, economic feasibilities also will be considered so growers will know the actual costs and benefits of using anti-transpirants.

Hormones: a fast food for young fish

Something fishy is going on in some Northwest hatcheries.

Researchers from OSU are testing the steroid hormone testosterone to speed up the growth rate of hatchery fish.

Carl Schreck, leader of the Cooperative Fishery Research Unit at OSU, said the incentive is economic.

"If hatchery fish can be reared in a shorter amount of time, costs can be reduced and the numbers of fish can be increased," Schreck said.

In laboratory experiments, salmon growth rates were increased by as much as 26 percent over normal in 16 weeks when the hormone was added to fish feed.

Testosterone, a naturally occurring hormone, is inexpensive, Schreck said. But research will continue until use of the hormone is perfected. Then, the U.S. Food and Drug Administration will be asked to allow use of hormones under regular hatchery conditions.

And a pinch to grow on . . . fish fed hormones can be raised in less time.

Exercise, diet offer more help than lecithin

Getting more exercise and sticking to a low-fat diet probably provides much greater protection against heart disease than the diet supplement lecithin.

"Lecithin is highly misunderstood as a supplement," said Elisabeth S. Yearick, professor of foods and nutrition at Oregon State University. "Claims that lecithin will clear excessive levels of cholesterol from the blood likely are unfounded."

But lecithin, a fat derivative, may help prevent tissue damage from excessive cholesterol and may prevent abnormal clotting, experiments with guinea pigs at OSU showed.

Yearick and graduate student G.W.S. Cusak fed diets containing both lecithin and cholesterol, and diets high in cholesterol alone, to guinea pigs. They found the animals were better able to process or excrete cholesterol and that less damage to the arteries occurred when the guinea pigs received lecithin.

Cusak also studied the function of lecithin in a blood-clotting mechanism of guinea pigs. The process of blood clotting is multi-stepped and involves several enzymes, or chemical activators. Platelets, minute flat bodies that circulate freely in the blood, are aggregated by ADP, an enzyme, and the mass of platelets forms the basis of the clot. Cusak's research showed lecithin may help desensitize platelets to the action of ADP.

"It is too early to say that lecithin supplements will benefit humans who are prone to heart disease or blood clotting, but research is on-going," said Yearick, an Agricultural Experiment Station researcher.

Lecithin occurs in animal and plant tissues as a component of cell membranes. It often is used in food processing to emulsify fat with water. The major sources of commercial lecithin are soybeans and egg yolk.

No dietary need or allowance amounts have been determined for lecithin. However, it has been sold as a dietary supplement.

Vegetables are his bag

Jim Baggett grows your vegetables.

An Oregon State University horticulturist, Baggett is a plant breeder.

Beans are his No. 1 priority. Peas are No. 2. He is responsible for the Oregon Sugar Pod Pea, which is being grown worldwide, and the Corvallis Pea, specifically suited for the Corvallis area. More recently, he developed the Oregon Cherry Tomato. The jury still is out on the cherry tomato, he says.

Baggett began his breeding project at OSU in 1956, concentrating on peas, brocoli and cabbage, along with some work in beans. In 1973, he took over a horticulture department project started in 1950 by W. A. Frazier. And beans became No. 1.

Frazier and Baggett were trying to get some of the good characteristics of pole beans to appear in bush beans. The result of their years of work was a variety called Oregon 58 and then Oregon 1604. Now, Baggett, still striving for more, said he might be close to developing a variety better than Oregon 1604.

The breeding process, although relatively simple, is time consuming.

"You start by searching for parent plants that exhibit characteristics that might be useful," said Baggett. "Disease resistance, higher yield and other biological characteristics from each parent sometimes combine to create something new and better."

It doesn't happen quickly. Generation after generation must be methodically evaluated year after year. Then, when something looks promising, it will be tested several years in the field.

Some contributions of the OSU breeding program have subtle but important impacts on the vegetable industry. They are used by commercial breeders to develop new varieties. Baggett developed a variety of broccoli resistant to clubroot fungus disease. He has released eight breeding varieties of peas used by other plant breeders and five carrot breeding lines were released this year. OSU bean lines have been used by other breeders for many years.

"It seems we have been releasing much more in the last few years," said Baggett. "But when you work on a project for 25 or so years, it takes you the first 15 just to get going."

With so much work on many vegetable varieties, what would be Baggett's favorite?

"Well, if you promise not to tell the bean growers, some of my favorites, after beans, are the curcurbits like squash and pumpkins," he said. "And peppers and lettuce have always interested me, too."

Jim Bagett, a man for all (vegetable) seasons.

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