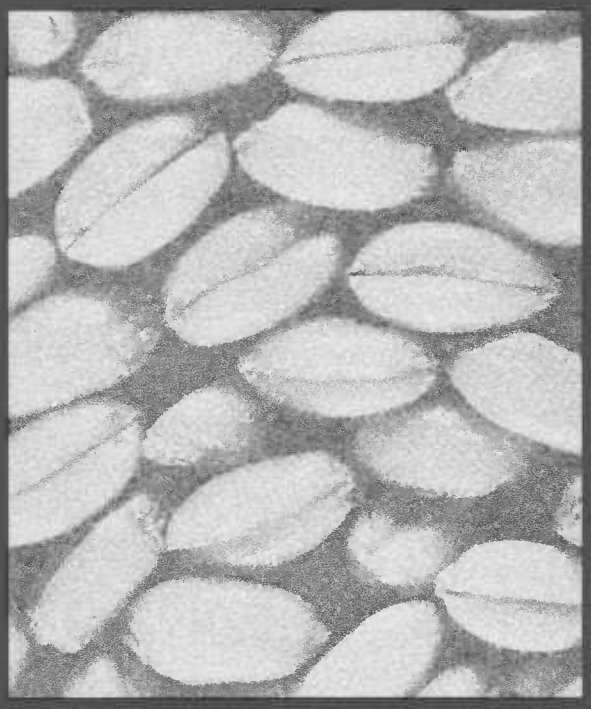
Oregon's Agricultural

Progress

Fall 1978



Agricultural Experiment Station
Oregon State University

Comment

John R. Davis, Director

In search of truth

Some economists refer to methods used by the public for registering complaints about publicly produced goods as either "voice" or "exit" reactions. The traditional method of substituting some other product when the original product is performing unsatisfactorily is called "exit," but it is of little satisfaction after you've already bought the original product that was a real lemon. "Voice," a substitution of complaint for "exit" is therefore increasingly resorted to by the public, because it often causes a prompt response or even a measure of satisfaction.

"Voice" is an effective method of calling attention to a problem or a concern, because other people usually get involved—especially in the political process. Because of this, some people have tended to use their voice influence dishonestly for personal gain or to persuade others toward their point of view. In some respects, many people generally feel that for every position taken there must be an antagonistic one—that if a person supports an issue, then that person is against other related issues. For example, if one supports the small family farm, it seems that this person feels compelled to speak against large corporate farms. If one is for organic farming, then one must be against chemical fertilizers. This antagonistic attitude seems to have reached the point that if one is for motherhood, one is against fatherhood.

Of course, having a strong view in favor of one concept and against the opposite view is logical and legitimate, but I am truly disappointed in those voices that express a view dishonestly or by throwing intelligence and common sense to the wind. Perhaps I am old-fashioned, but it seems to me that if a person strongly advocates that others adhere to a particular ideal, available knowledge and common sense should be a part of the mix.

This is where a university comes in—to provide knowledge and to generate new ideas, so the public can use that knowledge for making decisions, to debate issues, to arrive at good compromises and to examine critically their own ideas and opinions. The university often finds itself in the middle of a controversy and I often hear the comment from faculty that whatever the results or conclusions of a research project, we will make everyone mad at us. But that is all right—we are not doing research to win friends but to generate new knowledge. It is the arrogant advocate who refuses to use this knowledge who bothers me—the person who believes the University is bad because the knowledge it generates might conflict with his or her opinion.

Many people oppose the use of chemicals in agriculture, for example, and some of their concerns have prompted appropriate and legitimate research and regulatory activity. Some of the more vocal advocates seem to be opposed to the University's doing research on chemicals in agriculture entirely and attempt to discredit all of our research by stating that the research of the Agricultural Experiment Station is the captive of the chemical industry because the majority of our research is sponsored by that industry. This comment is purely self-serving, because the research support received in 1977 by the Agricultural Experiment Station from the chemical industry was only .4 of 1 percent of our total budget. In fact, the largest grant from the chemical industry was to conduct research on control of parasites in animals, especially liver flukes—hardly a controversial issue.

Obviously, the attempt to discredit the university with false claims is an attempt to persuade others to ignore knowledge in forming opinions. It is often a subtle approach, but it is book-burning at its worst, and the public should be aware that these tactics are in wide use on many issues—not only against universities but also against other scientific activities—primarily for self-serving purposes.

Rejecting knowledge and truth leads to anarchy. So you ask, who can I trust? First, examine the issues and ask yourself whether or not you have the knowledge necessary to provide an intelligent examination of those issues. Your voice is indeed important, but be sure the brain is fully engaged before the mouth takes over.

Oh—another thing—be sure you have a strong university that doesn't get pushed around too much. Support it well, my friend, because in these times of advocacy and antagonism, you need someone you can trust.

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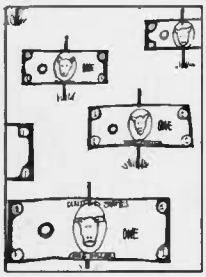

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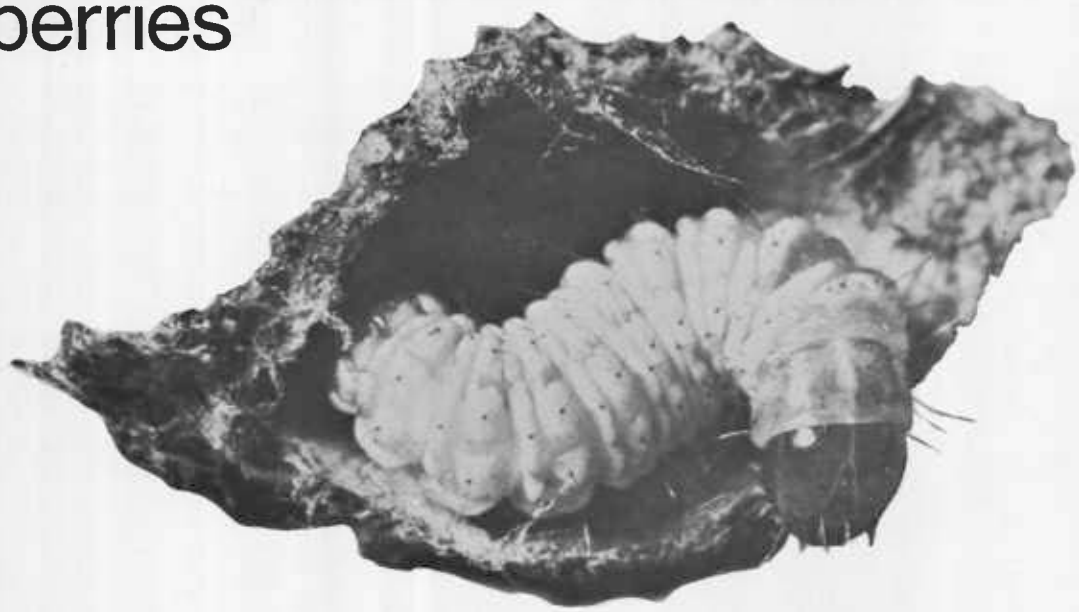
This worm turns to cranberries



A bandit is robbing grass seed and cranberry growers in Oregon.

The sod webworm, alias cranberry girdler, kills plants in grass seed fields and cranberry bogs every year. But an entomologist at Oregon State University is hot on the trail of the bandit with the ultimate weapon: sex.

James Kamm, USDA Science and Education Administration entomologist at Oregon State University, worked with Les McDonough, a fellow USDA researcher at Yakima, Washington, to identify the sex attractant, or pheromone, of the sod webworm. The two men hope that in a few years, grass seed and cranberry growers will be able to use the pheromone to monitor populations and perhaps even control the insects in fields and bogs.

Kamm said the pest has been difficult to control because feeding larvae damage the crops at a time of year when the insects are least accessible.

"Sprays for feeding larvae generally are not effective because, under normal conditions, it doesn't rain much in Oregon in September and moisture is needed to carry the chemical down into the grass crowns to kill the larvae. Insecticides, consequently, generally don't do much good in controlling the pest," Kamm said.

Adults emerge in late June or early July, mate and lay eggs almost immediately. The eggs hatch in 10 days, then the larvae bore into the crowns of grass seed plants in September and begin feeding. They feed until November. Damage becomes visible in September and October, but during that time the larvae are not susceptible to insecticides. Then the larvae go into hibernation for the winter.

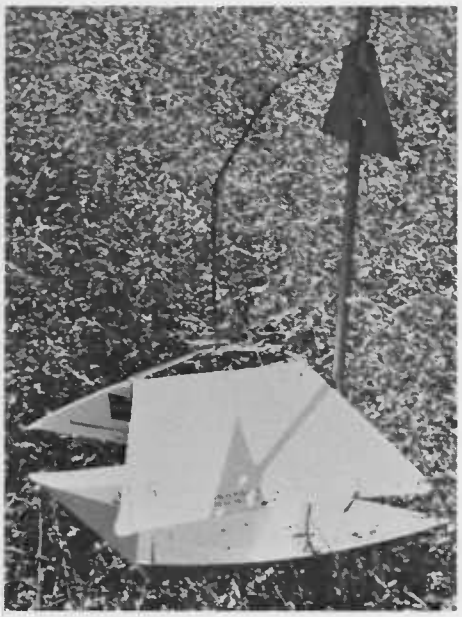
Damage caused by the insect also is unpredictable. Some fields are affected every year, while other fields may be affected only once every three or four years, Kamm said.

"A natural fungus disease can control sod webworms in some years, but farmers cannot predict from year to year when that disease might be effective. The fungus also requires moisture at the proper time, and farmers could lose their crops waiting for an epidemic to develop," said Kamm. Field burning does not affect the sod webworm.

The entomologist began looking at the potential of sex pheromones as a pest management tool in 1974. The task was not an easy one. Sod webworms are difficult and expensive to rear in the laboratory, so Kamm and Joseph Capizzi, OSU Extension entomologist, hired members of several youth groups to go into an infested grass seed field in the fall and remove the hibernating larvae.

"The kids did a great job and picked up about 25,000 mature larvae," Kamm said.

The larvae then were put into freezer containers and stored out-of-doors until Kamm was ready for the adults to



emerge. Then he removed the tip from the abdomen of the females where the pheromone is produced and extracted the pheromone from the other chemicals in the abdomen tip by using solvents.

"Once the pheromone was identified, Les McDonough synthesized the material in the laboratory, and then we put it in traps in infested grass seed fields," Kamm said. It worked.

"At this point, it looks like a single trap baited with pheromone will give us a good indication of the population density in from 2½ to 5 acres," Kamm said. "Cool, cloudy weather can decrease the trap catch, however, because the insects won't respond as well, but we can take this into account in evaluating trap catch."

Kamm said he spent this year looking at ways to make the attractant better. One limiting factor is that the pheromone deteriorates rapidly.

"We hope to improve the pheromone so it will last throughout the season," he said. "We want to make sure the pheromone will produce consistent trap catches so we can decide whether or not to control the adults with insecticide."

Another possibility is encapsulating the pheromone into small fibers that can be sprayed onto the field during the mating season to prevent the males from locating the females and, thereby, prevent mating.

"This is known as the 'confusion technique' and has proved to be an effective control for some pests. The nice thing about using pheromones for control is that there is not residue in the crop like insecticides," Kamm said.

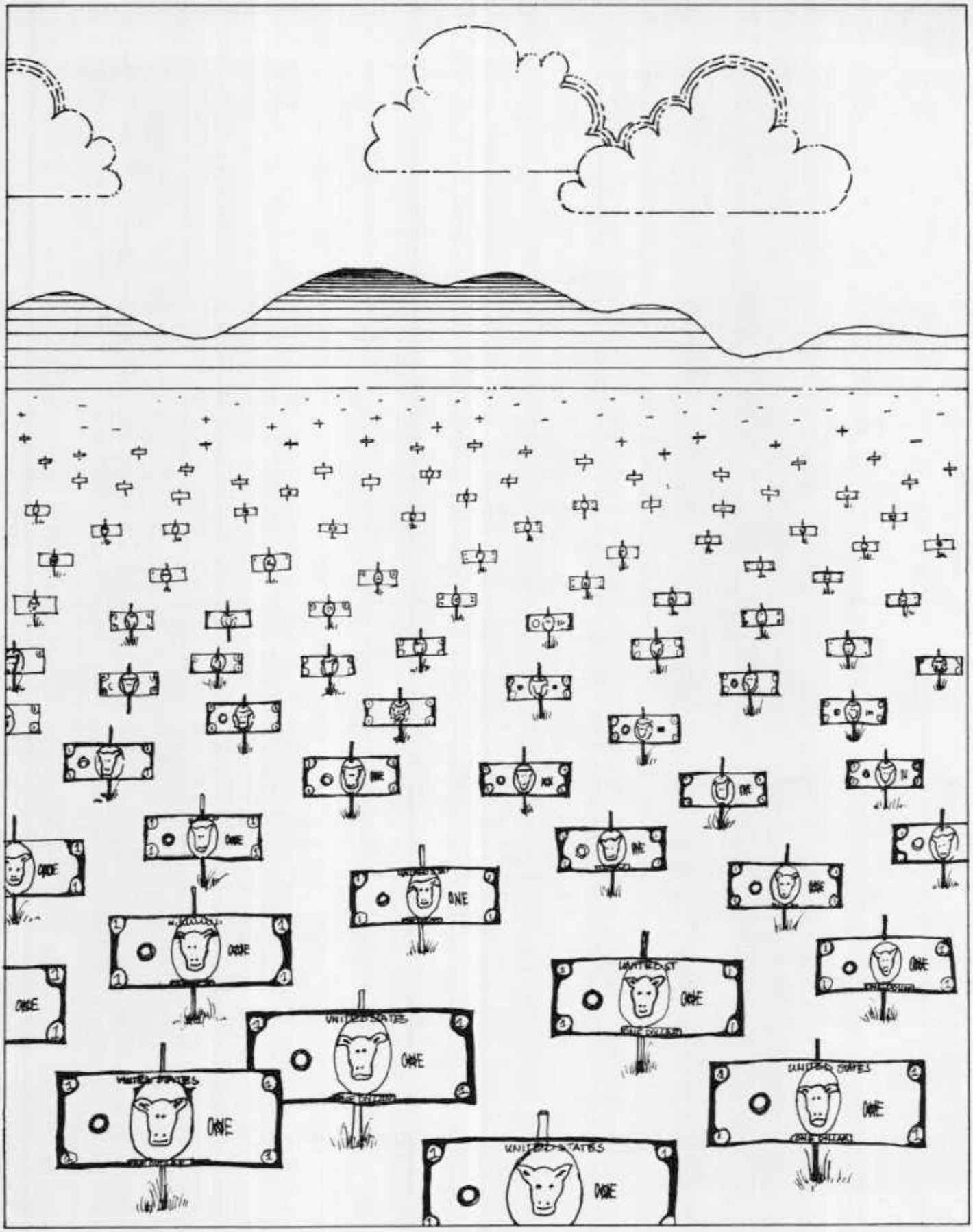
Oregon cranberries have a superior red color and are mixed with the less colorful berries produced in eastern states to brighten the holiday table. Oregon growers now plan to expand their acreage by 30 percent to meet the demand for their ruby red berries. Damage to cranberry bogs infested by the same insect can be severe and Kamm said methods developed to control this pest in grass seed fields probably will work as well in cranberry bogs.

"One cranberry grower near Bandon has a half-dead bog caused by feeding of the cranberry girdlers. He'll have to take it out and replant, and it takes about six years to get it back into full production. Grass seed fields also have to be replanted when a severe infestation of this insect moves in, and when there is only marginal damage, weeds can come in and make problems," Kamm said.

But help is on the way. Kamm said, "Once we learn to use the pheromone for field monitoring, growers will be able to detect infestations before any damage is done."

And then, the entomologist hopes growers can say "adios" to the bandit.

Members of several Corvallis-area youth groups (above) helped researchers by picking sod webworm larvae out of an infested grass seed field (above left). Pheromones extracted from the adult webworms in the laboratory helped the researchers develop a trap to monitor populations of the pests (left).


UNITED STATES
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FERTILIZER bucks up Oregon rangeland

The time has come for ranchers in eastern Oregon to reconsider fertilizing their rangelands.

"The price of fertilizers has stabilized, but more importantly, the value of feed has been increasing," said W. Edward Schmisseur, agricultural and resource economist at Oregon State University. "Ranchers should again look into fertilizing their rangelands."

Interest in rangeland fertilization to increase forage production at competitive costs was high prior to 1973. But when the oil embargo pushed petroleum prices up and forced fertilizer costs higher, ranchers quickly dismissed the idea of fertilizing the range, Schmisseur said.

Recently, Schmisseur and Richard Miller, a rangeland resources researcher at OSU, reviewed fertilization trials on a variety of eastern Oregon ranges. Results of their review and evaluation are being published as a circular of information by the Agricultural Experiment Station and a pamphlet outlining costs, benefits and management considerations soon will be available to ranchers from the OSU Extension Service.

"Basically, we found that the greater the site potential, the greater the yield response will be," Schmisseur said. "Response will be greatest in areas where soil moisture is least limiting, fertility is low and soils are deep with medium texture and good structure."

Native flood meadows were found most responsive to nitrogen fertilizer and the researchers said those areas were most likely to produce additional forage from fertilization at costs less than the purchase price of grass hay. At 21 different sites, the mean yield responses to applications of 60 and 120 pounds of nitrogen were 0.75 and 1.15 air dry tons per acre, respectively.

Less productive but still worth fertilizing were some foothill meadows. Sixteen foothill meadow sites yielded nearly 770 pounds more air dry forage per acre with an application rate of 80 pounds of nitrogen. Normally, yield on those sites ranges from 1,000 to 1,500 pounds per acre.

Fertilizing foothill ranges may or may not pay off, the researchers found. Range sites receiving at least 12 inches of precipitation averaged an increase of 300 pounds of air dry forage per acre with an application of 60 pounds of nitrogen, equal to buying grass hay priced at $35 per ton.

Least productive were the high desert ranges where low precipitation and sometimes cheatgrass limited forage production.

"On some sites, the cost of getting additional forage from fertilizing exceeded the cost of buying grass hay even if the price for hay went to $300 per ton," Schmisseur said. Fall grass hay prices in 1978 were about $40 per ton.

Management recommendations of the study included:

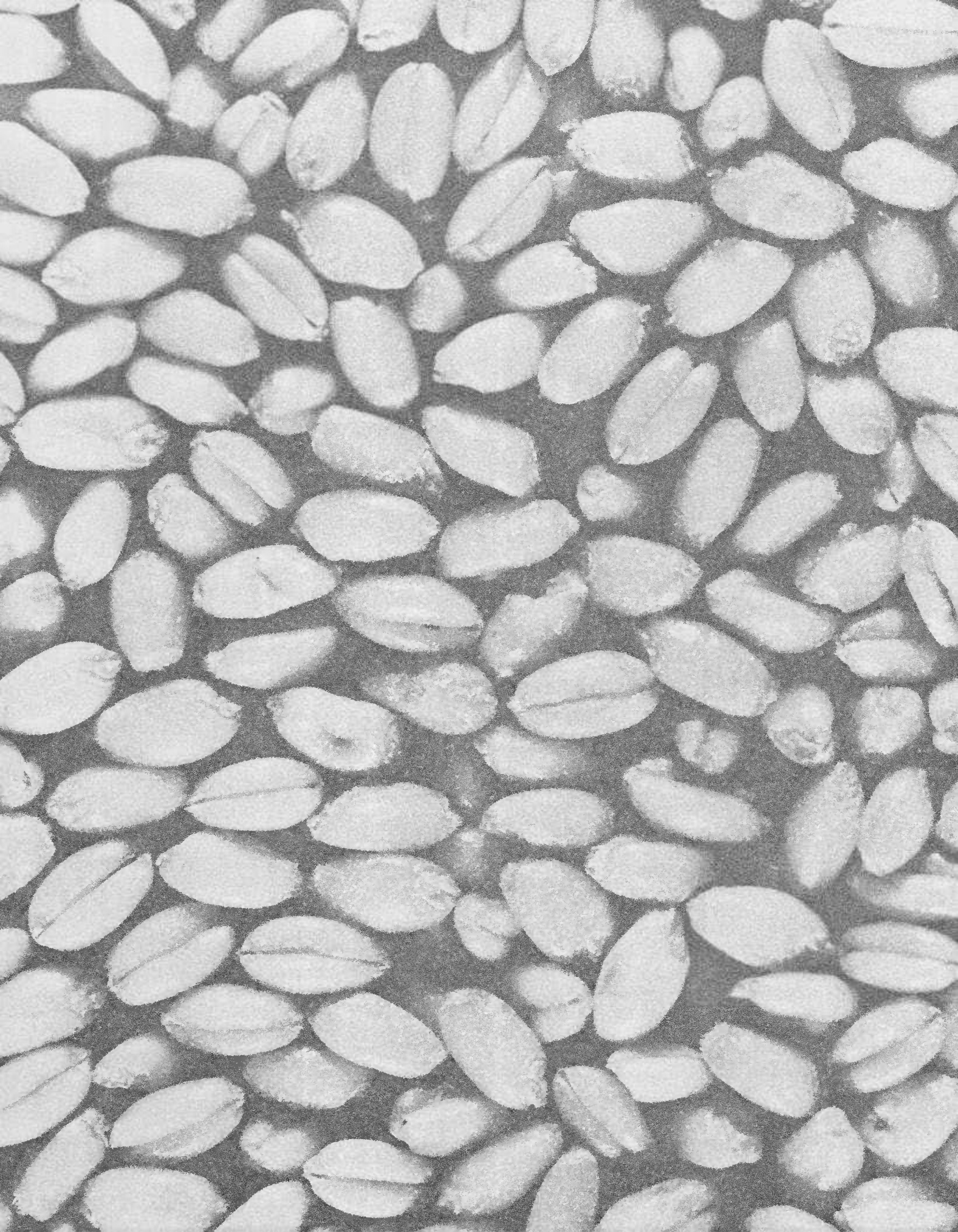
—Nitrogen was the most important component of any fertilizer studied and no source of nitrogen was better than another.

—Introduced forage species were more responsive to fertilizer treatments than native species but responsiveness varied among all grass species and was related to precipitation.

—Spring fertilizer applications were recommended because soil moisture availability can be predicted better in the spring and fertilizer programs can be adjusted accordingly.

Other advantages of rangeland fertilization could include improved distribution of animals on the range, increased total crude protein and digestible nutrients in the forage and, perhaps, improved erosion control.

"There still is much to learn in the area of rangeland fertilization," Schmisseur said. "But based on the relative price of fertilizer, feed costs and livestock prices, the time to consider fertilizing the range is now. The fertilization decision, however, should be carefully evaluated because responses to fertilizer are highly variable."



super seed

superseedsuperseedsupersee

With a little extra effort, wheat farmers can grow super seeds that will help increase yields.

Te May Ching, seed physiologist at Oregon State University, said fertilizer and water are the keys to growing bigger, more vigorous wheat seed that ultimately will yield better than wheat seeds planted now.

"We wanted to find out what was going on in these seeds," she said.

What she found was protein—nearly twice as much in seeds from fertilized plots than in seeds grown in plots with low fertilizer applications. Then she germinated the seed and studied the genetic and biochemical apparatus associated with embryo and seedling growth.

"Even in the first few days of germination, plants from high-protein seeds were bigger and fatter," she said.

Ching said Yamhill wheat seeds planted in the Willamette Valley generally contain about 9 percent protein. The high-protein seeds produced at OSU contained 15 percent protein and grew about 20 percent more than plants grown from seed with lower protein content.

"The most interesting finding was a doubled quantity of polysome in seedlings of high-protein seeds," Ching said. "Polysome is known to be the site of protein synthesis, and the more protein synthesized, the more growth would follow."

Other tests also confirmed the value of high-protein content. Amounts of RNA (ribonucleic acid, needed for protein synthesis and growth) and amino acids (the building blocks of protein) and two important enzymes associated with seed germination and seedling growth all were higher in the high-protein seed.

Not changed in the high-protein seeds, however, was the DNA quantity per seedling and the isozyme patterns of some enzymes. DNA controls the genetic code of the cells and transmits hereditary information in the seed.

"That's to be expected because genetically, the high-protein seeds were not different from the regular seeds," she said. "Only growth potential was boosted by more availability of raw material for growth."

Farmers usually do not differentiate between wheat grown for grain and wheat grown for seed. In fact, most farmers just take a portion of the grain and plant it for the next year's crop. To grow high-protein grain for seeds, Ching said, farmers would need to separate part of their field for seed production and treat it differently than wheat grown for grain.

"If they apply more fertilizer after heading and blooming and irrigate the field occasionally after anthesis or blooming, they can produce seed with more vigor," Ching said. Farmers usually fertilize wheat only when it is planted and do not irrigate the crop, particularly in the drylands.

Results of Ching's study will be published in the Journal of Plant Physiology.

A detective named ELISA

Both adult and larval forms of the green peach aphid (on leaf, left) can spread virus infections to potatoes, but testing with the ELISA method offers researchers a way to find out if seed potatoes are infected prior to planting.

ELISA might rescue the potato industry from the dreaded drooling aphid.

Melodrama is the exception in the world of plant viruses but a new virus detection technique is causing excitement at Oregon State University.

ELISA (enzyme-linked immunosorbent assay) is being used to test potato plants and tubers for potato leaf roll virus infection. Tests have shown ELISA to be 100 percent effective in discovering infected potato plants which otherwise may show no overt signs, particularly the tubers.

Richard Clarke, OSU entomologist, has been working on potato leaf roll virus since 1975.

"We knew the virus was transmitted from plant to plant by the green peach aphid," said Clarke. "It sucks virus-laden sap from an infected plant and inoculates another plant with virus carried in its saliva."

The virus stores well in tubers and when seed pieces are planted the next year, the new plants are infected. Volunteer seedlings not cleaned from a field also are a good source of a new year's infection.

The potato leaf roll virus may cause the plant little outward harm. As the season progresses, the plant may grow slower, droop a little and the leaves may roll slightly, but the real problem comes in the tuber. It develops net necrosis which is a net of dark discoloration just below the potato skin. It is a cosmetic problem and the potato is perfectly edible. But consumers don't want discolored potatoes and that is enough of a problem for potato growers.

"The best way to attack the problem," said Clarke, "is to make sure the seed is free from virus before planting. But that is easier said than done."

This is where ELISA comes in.

"ELISA is a serological technique using chemical color change to detect viral infection," said Clarke. "It is at least 100 times more sensitive than other serological tests."

This is of major importance in diagnosis of potato leaf roll virus because the viral concentration in tubers and elsewhere in the plants is very low.

The initial breakthrough came with the cooperation of Makoto Kojima, a plant virologist at Niigata University in Japan.

"Dr. Kojima was the first to isolate leaf roll virus and produce an antiserum against it," said Clarke. "He sent us some antiserum to test and it proved to be the link we needed to develop ELISA usage on this virus."

Antiserum contains antibodies which are proteins produced in the blood of a mammal. The antibody proteins attach themselves readily to the specific proteins which were used to stimulate antibody production in the mammal. This connection helps create the chemical color change that makes ELISA so useful.

"We were pleased that the antiserum worked so well," said Clarke. "And since the antibodies are specific, meaning they will attach only to the potato leaf roll virus, our tests have proved to be highly effective."

Some questions still need to be answered. Clarke feels the next step is one of technology.

"It is a great research tool in the laboratory, but what happens when we try to sample several thousand tubers or leaf samples? The process needs to be refined so it could be used to check commercial as well as seed-potato fields for virus," said Clarke.

If a commercial grower knows early enough the level of viral infection in the crop, it can be sold immediately and the potatoes used before the discoloration shows. If the grower stores the potatoes and net necrosis shows, the discolored potatoes are unsalable.

"ELISA's future will hold many things," said Clarke. "But the one thing I would really like to see is its incorporation into our potato seed certification program. It would be great to produce better seed with ELISA's help."

Oregon State University has become recognized as one of the leading research centers for ELISA (enzyme-linked immunosorbent assay). The USDA Science and Education Administration in cooperation with the Oregon Agricultural Experiment Station held a two-day ELISA workshop especially for state and federal regulatory officials on December 5 and 6 in Corvallis.

The workshop was conducted by Thomas Allen, OSU potato and ornamentals virus specialist; Ronald Cameron, OSU tree fruit virus specialist (featured in the summer 1978 edition of OAP); Richard Clarke, OSU virus vector entomologist; and Richard Converse, USDA small fruit virus specialist at OSU.

Unit cleans up livestock's act

Good news for those who live near a chickenhouse or swine barn: two Oregon State University agricultural engineers have invented a device to get rid of that awful smell.

"It's called an air scrubber and it does just that," said J. Ronald Miner, head of the agricultural engineering department. Miner and Louis Licht, a graduate student, applied the air scrubber to livestock and poultry confinement buildings.

The air scrubber contains a fan that pulls foul air from inside the barn through a series of air baffles and into a packing chamber filled with flowing water. The water removes the dust, odors and some gasses, then the air passes through a demister and is released outside.

Miner points with pride to the new invention that can clear the air near livestock barns.

"Ninety percent of the particles larger than five microns in diameter were removed with the air scrubber," Miner said. A particle of five microns is invisible to the human eye. Bacteria typically are one micron in diameter, the engineer said.

Tests to determine whether the scrubber worked also were successful.

"We hung swatches of cotton flannel at each end of the scrubber then asked test panelists to tell us if they could smell the difference. We had very positive results. Everyone could smell the difference between the swatch that had hung at the inlet (foul) end of the scrubber from the one that hung on the discharge (clean) end."

Water cannot be reused for drinking by animals because it accumulates ammonia which is converted to nitrates. Water from the system should be put into a septic tank or drainfield or could be used to fertilize plants, Miner said.

A description of the air scrubber has been made available to manufacturers and the Agricultural Experiment Station researcher is hopeful the device soon will be produced commercially. Miner estimated the air scrubber would cost about $100 or possibly less if added to an existing fan system.

"This is basically something to add to the chickenhouse ventilation system so when your neighbor calls and says your barn is too smelly, you can turn on the fan and reduce the smell," Miner said .

And to some rural residents, that would be a breath of fresh air.

Broiler industry lands a haymaker

When one tool casts two shadows, buy it.

That's what two agricultural engineers did when they read about a device to measure moisture in hay.

James K. Koelliker, associate professor of agricultural engineering, and Rick Dieker, an agricultural engineering student, were interested in quickly measuring moisture in poultry litter, important to the broiler industry.

Too much moisture can cause coccidiosis or other diseases and can lead to litter caking and breast blister which means market downgrading. Too little moisture causes a dusty environment leading to respiratory diseases and clogged machinery and ventilation equipment.

Working with Harry S. Nakaue, associate professor of poultry science, the researchers used broiler litter samples of wood shavings and manure accumulated from 8-week-old broilers. The purpose of their experiment was to calibrate the hay moisture detector and to weigh its usefulness.

The $100 detector is a simple device with a dial and an 11-inch probe. The probe is inserted into the litter and a reading taken.

Mary Pierson, research assistant, tests moisture in broiler litter with the special device.

The engineers decided the detector is suitable to rapidly estimate moisture content in material up to 45 percent wet basis. It takes about two minutes for a reading.

Above 45 percent, the detector readings are less precise and should be used only as an indication of very wet litter. The detector is insensitive below 15 percent because the litter is abnormally dry.

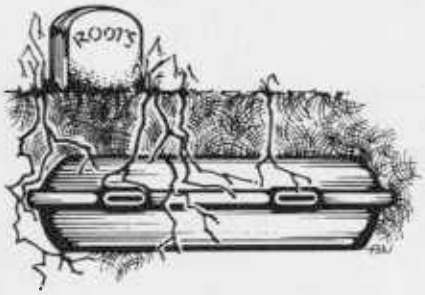
The tester's usefulness lies in providing an indication of moisture content rather than a precise measurement, the researchers said. However, when a quick indication of moisture is needed, the detector can be useful as a management tool.

Living roots wave red flag

Finding out whether a root is living or dead is not as simple as it might seem.

"In the Pacific Northwest, old and dead roots from crops such as wheat may be indistinguishable from living roots without time-consuming microscopic examination," said Kathy Ward, biological technician at the Columbia Basin Agricultural Research Center near Pendleton. "In our laboratory, we found that soil core samples may contain up to four times as much dead root length as living wheat-root length. This mixture of living and dead root material seriously restricts interpretations concerning root growth in field studies."

To overcome the problem of telling living roots from dead ones, Ward developed a method of staining roots with a special dye known as congo red.



"Living roots turned red and nonliving roots remained unstained or turned brownish-pink when stained with congo red," Ward said.

Before the roots can be dyed, however, they must be separated from clay, sand and other organic residues. The research technician also found a way to do that by putting soil core samples into a fine-mesh "root bag" and suspending the bag in a water-filled container. Then the container was shaken to remove some of the material.

"Roots, organic residues and sand remained in the bag, but fine soil, silt and clay were washed out," she said. The roots and organic matter were then decanted from the remaining sand and the congo red solution was added.

Ward and other researchers measured the length of the living roots on a standardized grid system and determined the amount of living root material with a high percentage of accuracy.

"We also found we could freeze the root material and still tell the difference between liviing and dead roots," Ward said.

A detailed description of the process soon will be published in the Agronomy Journal. The article is co-authored by Ward and USDA federal researchers Betty Klepper, Ronald Rickman and Raymond Allmaras, all of the Columbia Basin Agricultural Research Center.

Ground squirrels--cute but costly field pests

Damage caused by ground squirrels to alfalfa crops in eastern Oregon might be controlled by a method recently tested by an Oregon State University graduate student.

Stephen Kalinowski, OSU graduate student in wildlife, estimated that Belding's ground squirrels can damage up to 50 percent of the first cutting of alfalfa in Klamath County. A cutting might yield four tons an acre, but a farmer could lose two tons, or $100 to $150 per acre, to the squirrels. Total loss of alfalfa in Klamath County to ground squirrels can run up to one million dollars a year.

In their natural range of alpine meadows, 20 squirrels might be found per acre. In the prime habitat offered by an alfalfa field, however, 200 of the furry creatures might infest the same area.

"The squirrels eat the tender leaves of the plant and leave only stems for the farmers to collect," Kalinowski said. "They also damage the crown of the root systems which reduces the vigor of the plant and could cause an early death. Physical damage to the plant also can cut down its resistance to diseases such as root rot, a fungus infection."

Kalinowski began his study, funded by the OSU Agricultural Experiment Station, in January 1976, and completed field tests during summer 1977. Kalinowski studied the extent and types of damage the squirrels were causing and tested different applications of pesticide for controlling the damage.

Sodium fluoroacetate, better known as 1080 (ten-eighty), was the pesticide Kalinowski used in his study. A highly toxic chemical, 1080 is poisonous to all mammals, including rodents, such as the Belding's ground squirrel, carnivores, such as coyotes, birds and man.

"Legally, the local farmer cannot use this pesticide," Kalinowski said. "It can be applied only by a licensed applicator who is registered by the federal government.

"People have known since 1945 that 1080 is an effective poison for ground squirrels," said David deCalesta, OSU Extension wildlife specialist. "Steve wanted to find the most economical way to use it that had a minimum effect on other wildlife."

"I was concerned with minimizing poisoning of non-target wildlife, the small birds and mammals in the area, rather than the predators, such as coyotes, which range over much larger areas," Kalinowski said. "I conducted surveys to determine whether other animals besides the squirrels were being killed by the 1080."

Six ounces of the poison were mixed with 300 pounds of oat seeds and spread over the fields in different patterns during April and May. Application rates for the bait ranged from two to seven pounds per acre.

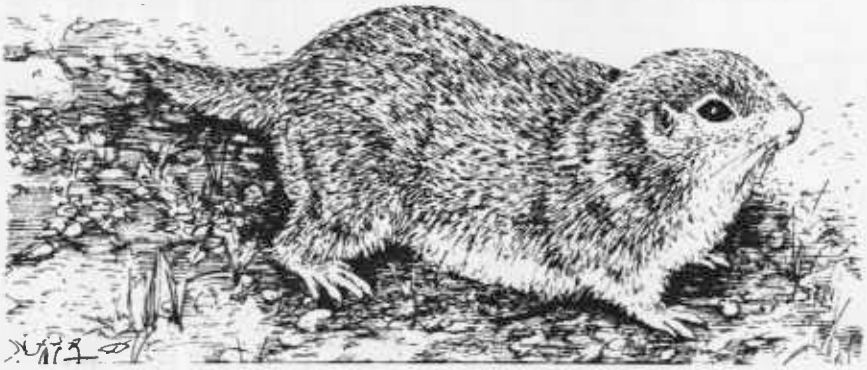
"Some fields were only baited once during the year, some twice," Kalinowski said. "And I baited a strip outside some of the alfalfa fields to see if it would reduce movement of the squirrels into the fields."

The application of the poison did reduce the amount of alfalfa loss. When Kalinowski poisoned in both early and late spring he reduced losses of alfalfa from 50 percent to 25-30 percent. When he baited the boundary strips in addition to the fields during both time periods, the loss rate dropped to 15-25 percent.

The first year of the survey, he found nine dead non-target animals in an area of 55 acres. "This is a very low number," Kalinowski said, "and the second year of the study I found no non-target animals that had been killed. It's my personal opinion that there probably were some non-target animals killed, but I didn't find them in the survey pattern I checked.

"There is no such thing as a perfect toxicant," Kalinowski said, "there will always be problems. I was looking at the mechanics of poisoning and my results should be applicable to any poison that has a similar kill rate and bait acceptance."

Ground squirrel illustration courtesy Seattle Audubon Society.



work in Progress

Counting sheep to take longer

Sheep ranchers in the Willamette Valley could be raising even more animals on their pastures.

According to W. C. Krueger, leader of the rangeland resources program of the animal science department of Oregon State University, if perennial ryegrass is coupled with a legume, most sheep ranchers currently are stocking at one-half to one-third of the pasture's potential.

The results are from research done for a doctoral thesis by Frank O. Thetford and Babiker El Hassan, who worked with Krueger.

Nine pastures were used with three grazing intensities and four grazing treatments. Each pasture was fertilized with phosphorous, a normal practice in the valley. Production of forage averaged 6,000 pounds per acre per year.

Pastures were grazed at three, four and five ewes per acre with different methods applied to each pasture through the use of protective cages. The cages were used to prevent the animals from grazing certain areas in the pastures.

Grazing treatments used were no grazing, seasonal grazing from April to January, fall grazing only and no grazing in the fall.

The main interest was in the effects grazing had on the total carbohydrate reserves required to start plant growth in the spring.

They also investigated how heavily the plants could be grazed each year and be expected to come back the following year with no damage to the plant.

They found the plants grazed season-long store more carbohydrates than those completely protected, but the researchers did not know why this occurs.

The researchers also discovered perennial ryegrass had a very good ability to withstand grazing, better than most perennial grasses. Heavy fall grazing did appear to depress the root growth some, Krueger commented. He suggested not grazing at high rates in the fall.

Summer grazing at all intensities did not seem to present any problems, although protein was generally deficient in the ewes' diet. In the spring, if the pasture is to be stocked in excess of four sheep per acre, then Krueger suggested turning the sheep on the pasture two weeks later than usual. "By doing this, the pasture should be able to be heavily grazed with no harm," Krueger said.

Based on the results, Krueger stated that, on a seasonal grazing plan, the pastures can be stocked at one ewe per 1,300 to 1,600 pounds total annual herbage production.

If the producer stocks at heavier rates, he feels they should not graze the pastures in early spring or fall.

Conditional ewes permit? By following guidelines of researchers, more animals can be pastured on available land.

profile

A new bouquet for winemaking

A sign over the door reads: "Life is too short to drink bad wine." With that in mind, a new phase of grape wine research begins at Oregon State University.

It is exciting to talk to David Heatherbell.

The new member of OSU's Department of Food Science and Technology is a native of New Zealand.

"What attracted me to Oregon was the great potential of the situation," said Heatherbell. "We have a young wine industry here, striving for quality."

Heatherbell is no stranger to OSU. From 1966 to 1970, he was a graduate student in the Department of Food Science and Technology. After receiving his doctorate, he returned to New Zealand to work for the Department of Scientific and Industrial Research. His specialty was juice and fermented juice products.

During the eight years before his return to Oregon, Heatherbell worked two study periods in northern Europe.

"Research in Europe is a little different than here," said Heatherbell. "They tend to overlap their juice technology and wine technology. I toured research institutes like Geisenheim in Germany and Colmar in France, because of the similarities between these great wine-making regions and areas in Oregon."

After his first trip to northern Europe in 1974, Heatherbell did consulting work for New Zealand wine and juice industries. And then came the decision to take the enology (science of wine making) position at OSU.

"It is an interesting situation," said Heatherbell. "I really think the American wine market is undeveloped and the chance for Oregon to become a major force is great."

Heatherbell's second study period in northern Europe came just before his arrival in Oregon.

"One interesting aspect here in Oregon is the potential of new grape varieties coming from Germany and parts of Switzerland and France," said Heatherbell. "The new varieties should be much more appropriate for this area than some varieties selected for California conditions."

The right color? Enologist David Heatherbell checks a bottle of juice destined for wine in the OSU research cellar.

This seems to be the key to Heatherbell's prediction that Oregon has the opportunity to become an important component of the American wine industry.

"We have the chance in Oregon to make styles of wine difficult to make well in California," said Heatherbell. "With the average per capita consumption of wine at somewhere between 2 and 3 gallons annually and rising, there are millions of dollars of imported wine being purchased—$80 million in Oregon. A great part of the German-style white wine being imported is no better than what we have the potential to produce here."

Heatherbell is an exciting man and will be an exciting force as the Oregon wine industry and enology research at OSU mature together to become an excellent vintage.

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