OREGON'S AGRICULTURAL

progress

WINTER 1982

Torching the Range

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comment

John R. Davis
Director, Oregon Agricultural Experiment Station

Branch Stations are undervalued

A recent, detailed study by several prominent economists on the values and economic impacts of production agriculture research found, among other things, that decentralizing scientists by appointing them to substations in states "had a positive effect on the productivity of state research systems." The study concluded that, "A public system of research can be decentralized in a manner that induces articulation among science, invention and practice to yield great returns. But thus far, the system remains undervalued."

Although most everyone agrees that branch stations require the basic scientific backup and services of the central staff in Corvallis, one must agree that the Oregon Agricultural Experiment Station's branch stations do indeed have a high value to all of Oregon's agriculture. In fact, since the beginning, the establishment of the Union station in 1901 in Union County, research at the branch stations has returned the state's investment manyfold. Each station has contributed to solving problems specific to its locale and has had a strong influence on the economic stability of its region. And, if the counties are in good health, so is the state.

A Brief Look

Let's look at these stations briefly so you'll get a feeling for the presence of Oregon State University and the Agricultural Experiment Station in your area:

- North Willamette Experiment Station near Aurora—This station, with three scientists, works on ornamentals and nursery production and small fruits and vegetables. It serves many growers, large and small, from Salem to Portland.
- Mid-Columbia Experiment Station at Hood River—Provides research for the intense and high-value pear and cherry areas of Hood River and The Dalles, as well as parts of the state of Washington. In exchange, Washington scientists assist Oregon growers in apple production.
- Columbia Basin Agricultural Research Center—Has its main location at Pendleton in facilities provided by the Agricultural Research Service, USDA, and has separate locations at Moro in Sherman County and at Hermiston. This center serves wheat and barley growers in Oregon's dryland grain-producing areas, as well as providing research support for irrigated areas of the Columbia Basin, especially the potato-producing areas near Boardman and Hermiston.
- Malheur Experiment Station at Ontario—This is in one of Oregon's most intensively farmed areas and provides research and demonstration for growers producing onions and potatoes on irrigated lands. It provides pasture production research, as well.
- Eastern Oregon Agricultural Research Center—With locations at Union and Burns, this is one of the superior stations in the West dealing with rangeland management and animal production in different range conditions. In cooperation with USDA, this station's scientists are nationally known for their research on rangeland plants and ecology and on range animal manipulation (including game animals).
- Central Oregon Experiment Station at Redmond, including sites at Powell Butte and Madras—Provides the main location for our potato variety research program, as well as for research on mint, grass, alfalfa and alternate crops.
- Klamath Falls Experiment Station at Klamath Falls—This is the only branch experiment station that receives substantial operating funds from the county (in this case, Klamath County). This area produces potatoes and livestock, mainly. Because of the unique soil and climatic conditions, growers need the special attention of the station.
- Southern Oregon Experiment Station at Medford—This station operates one of the nation's top research programs on pest management in tree crops—pears, in this instance. The station also evaluates performance of wine grapes and other crops, including seed crops.

Other facilities or programs not within the branch station framework, but which are close to growers or producers who need new ideas and technology, include a research facility at Brookings for lily bulb production; a program based at Newport for research on fisheries, oysters, hatcheries, fish diseases and marine mammals and operated in cooperation with the Marine Science Center and OSU's Sea Grant program, and the OSU Seafoods Laboratory at Astoria, designed to serve the fisheries industries of all of coastal Oregon.

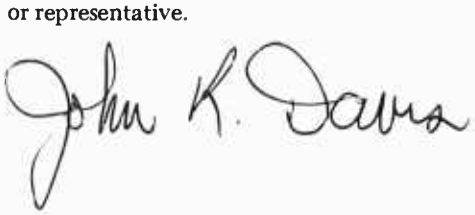
They Know the Territory

All Experiment Station scientists at these locations are dedicated, service-oriented people—and they know the territory. They deal with reality, with grassroots problems and issues. They provide the bridge between basic research and Extension programs.

Recent budget reductions have severely reduced these stations' ability to address problems important to every area in Oregon. But I have the feeling that scientists at these stations—and also at Corvallis, for that matter—are so close to the people they serve they still will work hard to produce high-value research results. The spirit of "we try harder" and "service above self" will prevail, I believe.

Oregon founded a grass roots program in agricultural research that relates directly to people on small farms, as well as large farms. Now that there are budget troubles, we need your help.

Use our research and the advice and ideas of our scientists and technicians, but also support your partners in progress and in the well-being of Oregon. Take time to attend field days, to serve on a station advisory committee, to visit the local station just to get acquainted or to ask a question. If you've already done this, tell us what you think of our work. Better yet, tell your state senator or representative.



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Cover: Burning rangeland makes it better. OSU researchers are studying how. See Page 8.

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The Hawks of Zumwalt Prairie

Ranchers are taking good care of some eastern Oregon birds—for good reason, a study shows.

The hawk is man's best friend, and vice versa, on northeastern Oregon's Zumwalt Prairie. At least that's the impression Marcy Cottrell, who recently earned her master's degree in OSU's fisheries and wildlife department, gives in describing two years of research she conducted in the remote area near Wallowa Lake in the foothills of the Wallowa Mountains. Cottrell went to the privately owned Zumwalt Prairie, cattle country named for an early settler in Wallowa County, to help the U.S. Fish and Wildlife Service, which funded her work, find out why three species of hawks seemed to thrive there. The agency thought the information would help wildlife specialists manage similar birds in other parts of the country. What she found were ground squirrels, hawks and ranchers linked in an impressive, but delicate, ecological system. The findings were reported in her master's thesis, prepared under the supervision of an Agricultural Experiment Station scientist, OSU fisheries and wildlife professor Charles Warren. Following is an account Marcy Cottrell wrote for Oregon's Agricultural Progress.

A stillness, almost desolate, seemed to envelop the morning. Rolling hills of bunchgrass stretched for miles in every direction, uninterrupted by homes or roads. A prairie wind blew lightly across the fields yellow with arrowleaf balsamroot, a native plant. In the distance a few cattle grazed.

Then suddenly the air was full of motion. A lone hawk took off from a rocky perch and, spreading its broad wings, circled and screamed, defending its nesting territory from an intruding hawk.

The morning had come alive.

I remember many such mornings on Zumwalt Prairie. I lived there in 1979 and 1980 with a local family while I studied hawks. The 200-square-mile grassland is home for one of the densest concentrations of nesting Buteo hawks in North America. Buteo is the generic name for broad-winged, open country, soaring hawks. Three species live on the Zumwalt Prairie: red-tailed, ferruginous and Swainson's hawks. They migrate there in the spring and nest there until fall at the unusually high density of nearly one pair every one and a half miles.

Some days Marcy Cottrell, right, rode horseback across the Zumwalt Prairie searching for hawks and nests. Here, she is with Carol Gregory, an OSU student volunteer.

Marcy Cottrell

When I went to Zumwalt Prairie, there was concern that two of the Buteo species, Swainson's and ferruginous hawks, might be declining in some parts of the United States because of their reluctance to nest where there is much human activity (and consequent loss of natural habitat). The U.S. Fish and Wildlife Service felt that understanding why the hawks nest in such high density on the Zumwalt Prairie would help provide management guidelines for other areas.

It is an excellent example of a healthy system in working balance between wildlife and man.

The Zumwalt Prairie is the southernmost extension of the Palouse Prairie, an important wheat-producing region of the United States. Although most of the Palouse has had a large part of its natural vegetation altered by cultivation and water impoundment, the Zumwalt Prairie is still composed primarily of native species of bunchgrass. It is owned by cattle ranchers and is recognized as one of the best examples of native prairie in good condition remaining in the Northwest. This brought up another question for my study: What range management practices of these private landowners were tending to favor such a large population of hawks?

The first step was to determine the density of breeding pairs of the three species. During the spring and summer of 1979 and 1980, I hiked an average of 10 miles a day to locate nesting pairs of hawks over my 150-square-mile study area. Once I found the nests, I visited them regularly through the summer to determine the success of hatching and monitor the development of young hawks. Volunteers from the Oregon Department of Fish and Wildlife, the Forest Service, the Soil Conservation Service and other interested friends helped with the nest checks.

With these young ferruginous hawks is a Belding ground squirrel, a prime food for the hawks of Zumwalt Prairie. In the lower photo a volunteer from the Oregon Department of Fish and Wildlife climbs up to inspect a nest. Such checks helped Marcy Cottrell keep track of young hawks and find out what the birds ate.

Often I wouldn't see another person during the long walks. Other times a rancher on horseback, perhaps driving his cattle to late-spring and summer ranges, would stop to visit.

Ranchers provided a wealth of insight into the prairie hawks, such as where each species nested and what it ate. A fine sense of appreciation for the wild birds was apparent.

"Are you the bird girl?" a rancher asked me one day, eying the binoculars dangling from my neck and the notes and maps in my arms.

"Yes," I replied.

"Good. I have a question for you," he said. "You're not going to disturb those hawks are you?"

I quickly answered no, just study them.

"Well, those hawks are important to us," he said. "We have a real ground squirrel problem out here. The squirrels eat so much of our grass they compete with our cattle. That's why the hawks are sacred to us."

"Sacred?" I said, surprised by the term.

Cottrell released this six-week-old red-tailed hawk, just banded, so its movements could be monitored.

"Yes, sacred," he shot back. "They're the best ground squirrel control we have."

The rancher was right, I found. For two years I collected information on the hawks' food by gathering prey remains and regurgitated food pellets in nests. When I checked the nests, I found many contained the remains of Belding ground squirrels. Volunteers who checked many of the hard-to-reach nests found the same thing.

"If I ever find a hawk nest while I'm plowing, I drive the tractor around it."

With complete analysis, I found the Belding ground squirrel made up at least 83 percent of the diet of each of the three species of hawks. This prey species is associated with rangeland that is in good condition. It prefers areas where succulent, perennial grasses abound and are not overgrazed. The Zumwalt ranchers, through efforts to improve their range by creating stock ponds to increase water availability, by protecting the soil and by limiting grazing, which allows for more perennial grass species, have provided a favorable habitat for the ground squirrel. That, in turn, provides an abundant food source for red-tailed, ferruginous and Swainson's hawks.

Ranchers often expressed their appreciation of the hawks. Many ranching families told how much they enjoyed watching nesting hawks raise young year after year. Several asked me how to encourage hawks to nest on their land. A farmer near Joseph, Oregon, one day explained a special method he used to protect hawks nesting on his land.

Pointing to a far corner of his cultivated field, he asked me, "See that mound over there?"

In the distance, a large clump of grasses stood out against the furrowed ground.

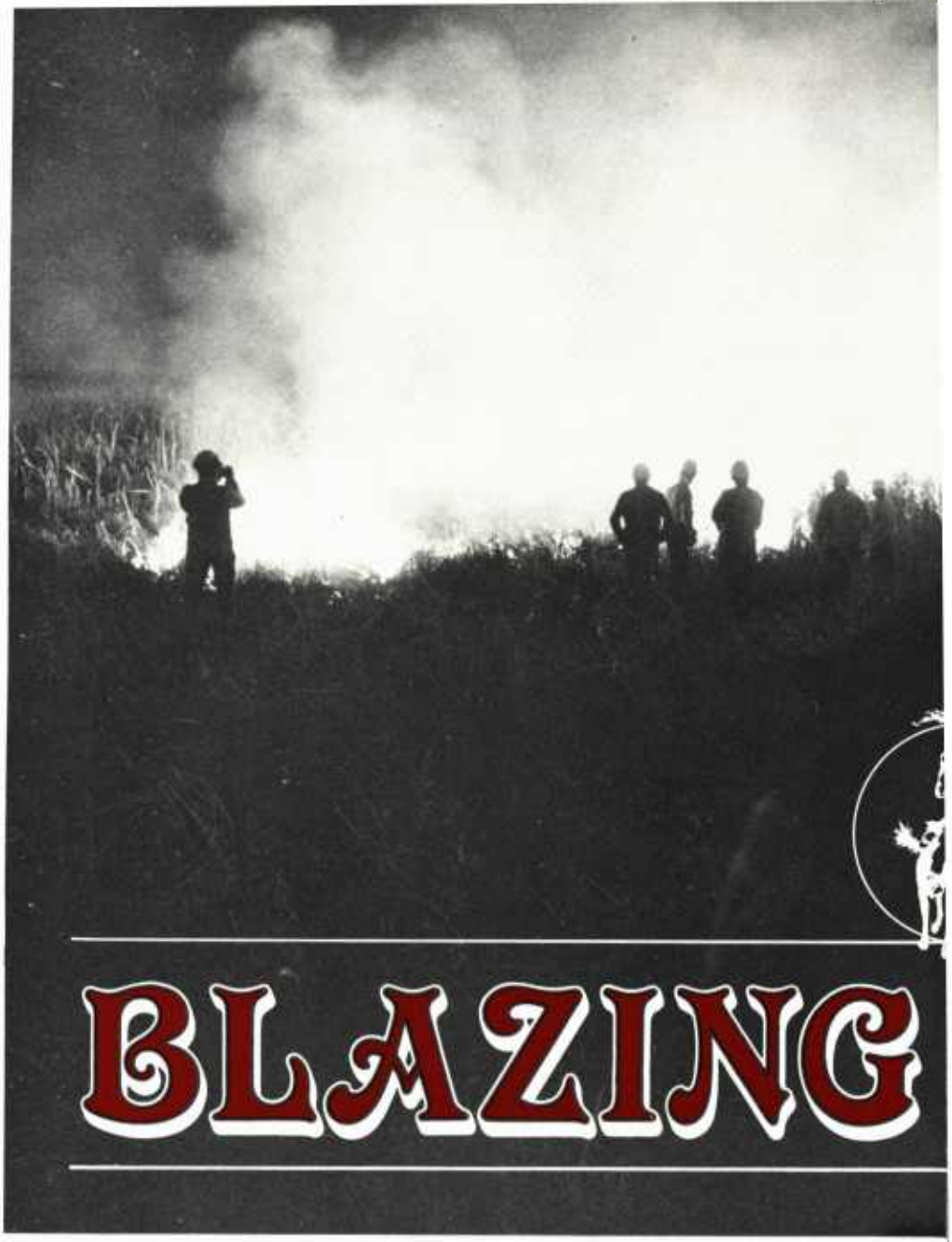
"A marsh hawk nests there. Four eggs. Surprised?" he said. He paused and looked me in the eyes. "I want you to know something. If I ever find a hawk nest while I'm plowing, I drive the tractor around it — leave it alone. I never disturb a hawk nest."

I studied the nesting habitat of the Buteos. By classifying nesting areas according to vegetation, soil and topographic characteristics, I found another explanation for the hawks' ability to coexist in such high numbers.

The Zumwalt Prairie, although a grassland ecosystem, has a diversity of vegetation creating a mosaic of habitat types. I observed each hawk species generally selecting a type of nesting area that differed from the other two species. Red-tailed hawks were abundant in the cottonwoods that lined irrigation ditches and intermittent streams. Ferruginous hawks used rocky outcrops and isolated stands of pine trees which dot the prairie. Swainson's hawks preferred small stands of aspen on north slopes in the grassland.

The border between an open area and cover is known to produce areas richer in wildlife. Range management practices allowing for diversity of vegetation are thus beneficial. The ranchers of the Zumwalt, as a result of not overgrazing their rangeland, favor the growth and persistence of aspen and pine trees as well as the ground squirrels used by the nesting hawks.

The isolation of the Zumwalt Prairie, its abundant small mammals and diversity of natural habitat all help provide an environment for the large birds of prey. It is an excellent example of a healthy system in working balance between wildlife and man —a prairie wild and diverse as a result of the good stewardship of concerned landowners. □



BLAZING

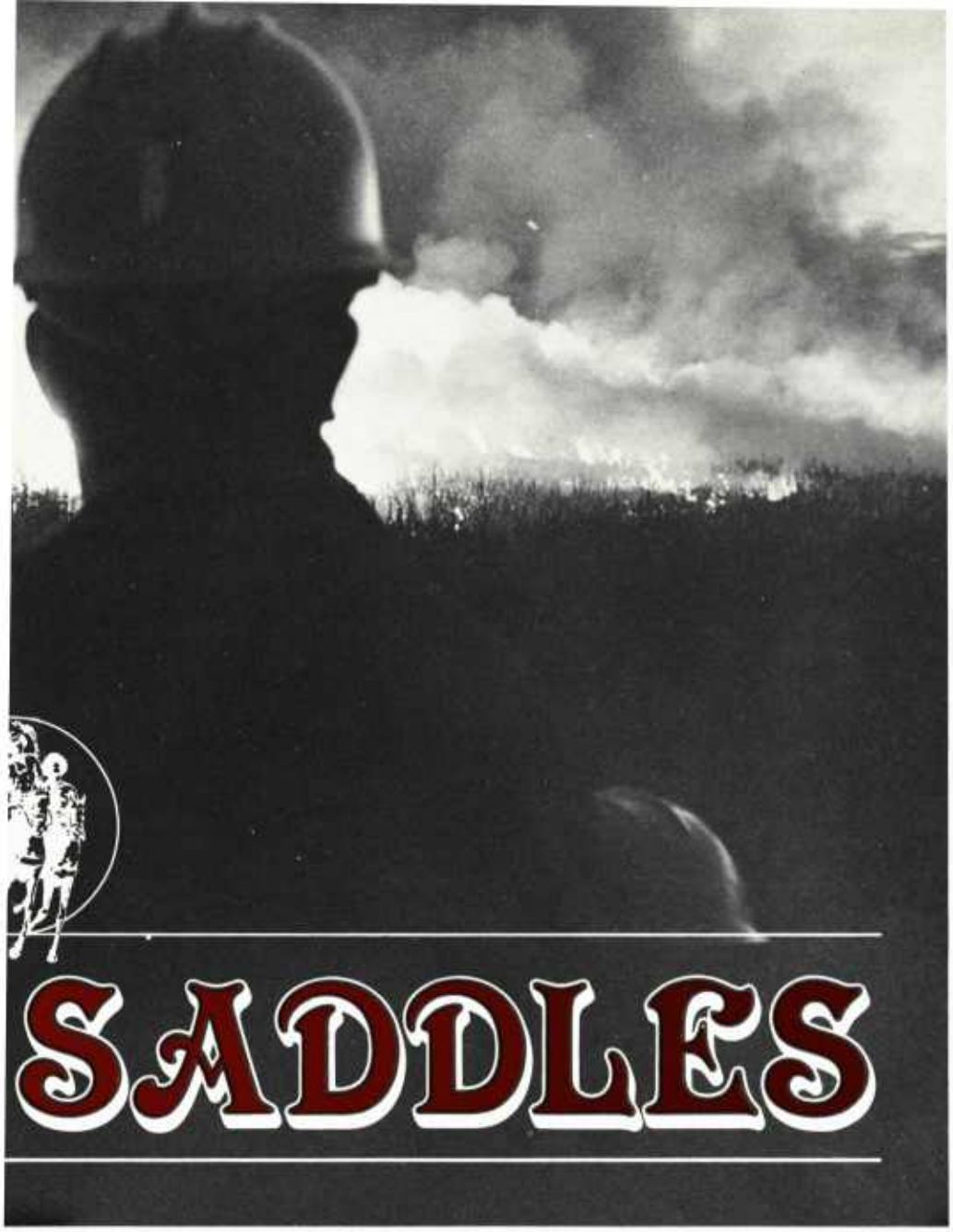
Burning rangeland kills sagebrush like the bush above and helps grasses, say OSU range scientists. Below, researcher Rick Young sets fire to a test site in the Malheur National Wildlife Refuge.

On the surface it seems "Blazing Saddles," title of a Hollywood spoof of western movies, would be a fitting code name for some goings-on at OSU's Eastern Oregon Agricultural Research Center at Burns.

There are folks at the facility absolutely fascinated with the best ways to start a range fire. But fight back images of cowboys galloping around with torches in hand. These guys act like firemen.

"Our goal is to gather basic information that will help ranchers and public land managers do an effective, cost-efficient job of knocking out invading plants such as sagebrush and juniper trees," said Rick Miller, a range scientist involved in the project.

A fire, if it's the right kind at the right time, can double or triple forage production over a 10-year period by reducing the competition for sunlight, moisture and soil nutrients, Miller explained.



SADDLES

That's not exactly a revelation, he and other researchers agree.

"You can go to the literature and find quite a bit about the effects of fire. But it's mostly wild fires," said Carlton Britton, a range management professor at Texas Tech University who started the Burns fire research in 1976 while working for OSU.

A fire, if it's the right kind at the right time, can double or triple forage production.

Historically, Britton noted, wild fires swept across the Oregon range every 40 to 70 years, removing buildups of dead materials and killing many woody plants (quick-growing grasses re-emerged in the burned areas). But heavy livestock grazing, which removed fine fuels such as dead grass, and modern firefighting dramatically cut the number of wild fires at the same time man-made fires were decreasing.

People of yesteryear knew the value of a flintstone or match, according to Britton.

"The Indians used to burn an area to increase the forage production and bring in game animals," he said, "and in the 1920's and 1930's ranchers and farmers used to burn a lot, but not in a sophisticated way."

It was the emergence of the "Smokey Bear attitude" that all fire is bad, and the development of potent herbicides after World War II, he said, that eliminated burning as a substitute for wild fires.

Until recently, that is.

"There's been a sort of renaissance in thought on burning in the last 10 years," Britton said.

Environmental concerns about herbicides and the rising cost of the chemicals are making fire more attractive, he and Miller said. The cost (in dollars and labor) of other methods of controlling undesirable plants, such as mowing or using heavy equipment to remove trees, also is rising, they noted.

Such developments sparked the OSU study.

"There's been a sort of Renaissance in thought on burning."

There are two specific objectives, according to Miller. One is to develop graphs, charts and other sources of information ranchers and others can use to help them spot range areas suitable for burning (there must be enough fuel to keep the fire going) and then to burn the areas effectively and safely. The other objective is to chart how fire affects various forages and other plants.

"We're hoping to give them something that says with this temperature, relative humidity, wind conditions and vegetation you'll get this type of burn," he said. "They have to know in advance the responses of different grasses at different times of the year, although fall is usually the best time to burn."

Burning is not as simple as it may seem, according to Miller, who is apt to be overheard these days chatting with other range scientists at the Burns station about "backfires," "strip burns" or "ignition techniques."

He is working with fire control experts such as Bob Martin, a U.S. Forest Service researcher stationed at Bend who is teaching him the complexities of burning. He's also learning that various types of fires — above-ground fires, ground-level fires, hot burns, cool burns and so on—have different effects on range vegetation.

That, too, must be charted, and Rick Young, an OSU doctoral student in rangeland resources, is helping.

Young already is something of an old hand at burning. In research being con-

ducted in cooperation with officials at the Malheur National Wildlife Refuge south of Burns he is midway into a three-year attempt to evaluate how fire behaves in refuge wetland areas and how burning will change the areas.

"I'm not really trying to produce more mallards or more Herefords."

"When I'm finished," he said, "I hope to be able to tell refuge managers that, given these weather and fuel conditions, this is how the fire will behave and, given this fire behavior, this is how the plants will respond."

"I'm not trying to predict what the wildlife will do," Young said, explaining that officials at the Malheur refuge, largest bird sanctuary in the United States, hope the study will help them learn to use fire to upgrade areas important for wildlife.

In the past, practices such as allowing grazing by privately owned cattle and cutting vegetation for hay have helped maintain productive areas on the refuge by reducing buildups of dead and undesirable plants, Young noted.

Preliminary results suggest fire works as well or better, he said, noting that fire also removes materials cattle won't eat.

"The increase in plant productivity with burning is incredible. It can increase 50 to 100 percent initially, although that drops gradually over a 10- to 20-year period," he said.

Some ranchers consider burning on the refuge wasteful, he pointed out.

"You talk to a rancher and he'll say you're burning forage. You talk to a wildlife person and he'll say you're managing habitat," he said. "I'm not really trying to produce more mallards or more Herefords. The baseline information you need for burning is the same, no matter what your eventual product. I'm doing basic research. A lot of it could be used on wetland or rangeland."

Many of the refuge plants are important on other rangelands, according to Young.

"There's greasewood and rabbitbrush, for example," he said. Ranchers may want to know,'If I burn, am I favoring grasses or shrubs like those. They may have marshland and want to get rid of bullrush and cattails. My study results will tell them how.'"

Western wildlife refuge managers, top photo, flocked to the Malheur refuge near Burns last fall for a seminar on how to burn land to improve it. OSU range scientist Rick Miller, bottom photo, predicts burning won't replace chemicals in range brush control. Burning is a useful option, though, Miller says.

Just the same, Miller, too, acknowledges that private landowners and public land managers—most land in eastern Oregon is public—view burning differently.

Eliminating all sagebrush in an area can pay off if you're raising cattle, he said. But wildlife such as mule deer and antelope need some sagebrush. They eat it at certain times of the year and it protects them during activities such as fawning.

"From the government, multiple-use land management point of view, burning still works," he said. "If it's done right, it improves forage production and doesn't wipe out all the brush."

In the future, the economics of burning needs attention, the researchers say.

"I think the cost of burning in most areas ranges from about $3 to $10 an acre," said Britton recently while in Burns to help with a seminar held at the Malheur refuge to acquaint refuge managers from other parts of the West with burning techniques.

The cost of burning varies with the need for chemical fire retardants and the amount of plowing, bulldozing, mowing and other time-consuming chores needed to keep flames in check, he explained, adding that burning areas of 1,000 acres or larger boosts cost-efficiency.

As a generalziation, the expense of burning rangeland is about the same as spraying

brush with chemicals such as the popular and effective herbicide 2,4-D, which kills woody plants but not forages, Britton said.

"But some people are getting gunshy about chemicals," said Miller. "Burning is not a cure-all, not a panacea. I don't think it's going to replace 2,4-D. But it is nice to have the choice." □

OSU food scientist Jane Wyatt, left, fed rats Mexican food in her study of how a high-fiber diet affects the body's ability to use iron. With Wyatt is Pat Walker, assistant director of OSU's Laboratory Animal Resources Center.

Too much fiber: a body robber

Fiber, praised in food advertisements in recent years, can rob the body of iron and cause anemia if you eat too much of it, OSU researchers studying high-fiber Mexican diets have found.

That means persons south and north of the border with high-fiber diets need to pay careful attention to the amount of iron in the foods they eat and to how easily the body can use it, according to Jane Wyatt, an OSU food science professor who did the research with Salvador Garcia-Lopez, a graduate student.

Wyatt explained the body needs iron to make red blood cells. Anemia is a shortage of red blood cells and is a fairly common medical problem in Mexico and the United States, especially among menstrual-age women.

The study, initiated because Garcia-Lopez wanted to do research for his master's degree thesis that might help improve nutrition in his native Mexico, included feeding various combinations of cooked beans and corn tortillas—typical Mexican family foods containing lots of fiber—to anemic rats and measuring how the iron in the foods was utilized by the rat.

As the percentage of fiber in the animals' diets went up, the amount of iron absorbed into the blood went down, the researchers found.

They also discovered tortillas contain a more readily available form of iron than beans do. But the level of iron in tortillas is much lower than the level in beans.

"One of the things we talked about," said Wyatt, referring to Mexicans' traditional high-fiber eating, "was the possibility of making the tortillas from iron-enriched flour, something not generally done in Mexico today. But it would be important to enrich the flour with the most biologically usable form of iron."

Red meats are a good source of readily available iron, she said, and incorporating foods high in Vitamin C, such as citrus fruits, into the diet helps the body utilize iron.

"A balanced diet is the best way to go."

In the United States, many people have access to vitamins containing iron, but such supplements are not generally available in Mexico and developing countries, according to Wyatt.

The plusses and minuses of high-fiber diets have been recognized for years, she noted.

Fiber, made up of the cell walls of grains, vegetables and fruits such as wheat, corn, beans and apples (raw foods are especially high in fiber), passes almost unaltered through the upper digestive tract of humans into the lower intestine, where it helps eliminate waste. But, as Wyatt and Garcia-Lopez learned, an abundance of fiber also can sweep valuable minerals such as iron and calcium away before the body absorbs them.

"It has been said Americans are not getting enough dietary fiber," Wyatt said. "The food industry has responded by introducing foods with more. Our recommendation is not to overdo it. A balanced diet is the best way to go." □

Right: OSU crop scientist Dave Chilcote examines growth retardant he's discovered boosts seed production in grasses. Lower right: Chilcote with soybean plants. The shorter plant on the right was treated with the growth retardant.

Grass Seed Surprise

OSU crop scientists have discovered a way to cause some grasses to produce about twice as many seeds.

The news is sure to get the attention of anyone in the Willamette Valley's $100-million-a-year grass seed industry, which produces lawn and pasture grass seeds sold the world over, or in jobs affected by the grass seed industry.

The key to the innovation, developed by Dave Chilcote, Harold Youngberg and other researchers, is a chemical compound that keeps plants from growing.

"I've always felt there was a role for manipulating plant growth with chemical retardants and stimulants," Chilcote said, explaining that in 1971 he started experimenting with chemicals that restrict grasses' stem growth, hoping that would produce more seeds.

Several compounds he tried retarded stem growth. But they were unpredictable and retarded seed production,too.

"That's the beauty of scientific meetings," Chilcote said. "I was at a meeting in Nevada in 1977 and heard about this retardant that had been developed to control vegetation along roadsides."

The compound retarded the size of roadside plants. The problem, it seemed, was that it didn't interfere with seed development.

"I thought, how great," Chilcote said. "This is just what we're looking for."

By the spring of 1980, armed with promising results from laboratory experiments; the OSU researchers planted test plots of various grasses at OSU's experimental Hyslop Farm just north of Corvallis.

Seed yields were very impressive, but Chilcote and the others were cautious, figuring the next year would tell more about how reliable the compound was and how accurate 1980 testing was.

In 1981, seed yields in plots of perennial ryegrass, a major Willamette Valley crop, astounded them (the yields ranged from a 54 percent increase in one variety, Caravelle, to a 156 percent increase in another variety, Linn).

"That said 1980 wasn't a fluke," Chilcote said.

"In 1981, seed yields . . . astounded them."

Two question marks still hover over the growth retardant: First, because it is in the experimental stage, no one knows how much it will cost. Second, it has not been cleared for use by various government agencies.

"Two companies are testing compounds which are similar in effect and they keep telling us the compounds are going to be economical to use," said Chilcote. "We do a lot of things now that cost $50 an acre. I think it may be no more than that.

"The main thing is that it's going to increase the grower's efficiency per unit worked," he said. "Some growers may say we don't need more seed, considering the current market. But they need to realize this may provide an opportunity to use part of their land for something else—growing wheat, maybe. Efficiency and diversification are real keys to survival these days."

One company is applying for necessary clearances, he added, and it appears a retardant could be available to growers by 1984 or 1985.

"It's going to increase the grower's efficiency per unit worked."

OSU crop scientists, meanwhile, are studying precisely how the retardant increases seed yields. It is by preventing lodging—keeping grasses from growing tall and then falling to one side when battered by wind or rain—Chilcote assumes.

Grasses have difficulty cross-pollinating as they should and capturing sunlight when stooped over, he said, noting that retarding stem growth may encourage grasses to channel more energy into their seed-producing sites.

"We're still harvesting only a small percentage of the potential seeds in the Willamette Valley," he said. "Only 20 to 30 percent of the seed sites on the average grass plant actually produce mature seeds. The retardant helps us raise that rate to about 40 percent.

"What else can you do to increase seed production?" he said. "Fertilizing is getting very expensive."

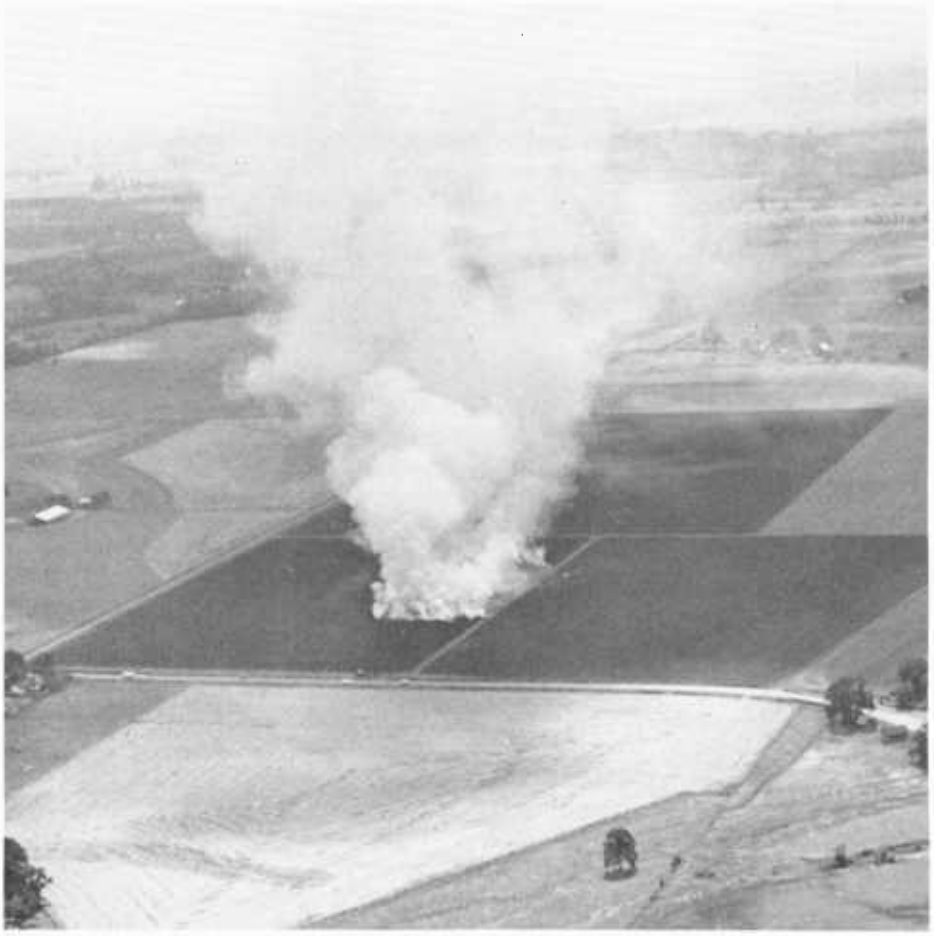
Seeds produced using the retardant have good weight, an indication of good quality, Chilcote added, noting that the retardant is put in the soil and need be applied to a crop only once.

The retardant has increased seed yields in grasses such as tall fescue and fine fescue, as well as perennial ryegrass. Preliminary study suggests it may have a similar effect on wheat and tests with alfalfa and rapeseed are planned, Chilcote said.

Chilcote envisions other benefits in the Willamette Valley, where burning of straw residue after grass seed harvest produces controversial smoke pollution.

By reducing stem growth and boosting seed production efficiency, the retardant might reduce the total amount of straw and number of acres burned by grass seed growers, he said. Also, without lodging, grass seed harvest leftovers would dry quicker—and dry straw produces less smoke than moist straw when burned. □

Above: The chemical Chilcote is testing increases grass seed production by keeping plants from falling to one side —lodging—as this perennial ryegrass did.
Below: Widespread use of the growth retardant in grass seed production might make field burning easier, Chilcote says.



research notes

Chumming home

Chum salmon, once the basis of a busy Oregon fishing industry, have all but been eliminated in the state since post-World War II's urbanization and industralization ruined spawning grounds in many streams.

Thanks to the work of OSU fisheries experts and cooperation among the Agricultural Experiment Station, OSU's Sea Grant program and the Oregon Department of Fish and Wildlife, there's hope for a comeback.

Eggs taken from a few surviving chum at Whiskey Creek near Tillamook in 1969 formed the basis of a record run last year (7,000 chum salmon adults) and a smaller run of 3,000 adults that returned to spawn this fall.

The reduced 1981 returns to the OSU Experimental Hatchery in Netarts Bay, set up through the Agricultural Experiment Station in the 1960s and now run cooperatively by Sea Grant and ODFW, might suggest to some that other techniques are needed to revive the species in Oregon.

Not so, says OSU fisheries professor Jim Lannan, a Sea Grant researcher who has worked almost 10 years on the restoration project.

OSU research assistant Phil Lamberson inspects a chum salmon that returned to Whiskey Creek to spawn.

Though all data from the fall run are not sorted out, Lannan believes the smaller return may have been the result of poor performance in the ocean by fish from the 1978 brood year (chum salmon return to their spawning grounds as three- and four-year-olds).

"To some degree, it seems to be a coastwide phenomenon," he said, adding that another bumper crop of chum—products of the 1979 brood year—may swim up Whiskey Creek to spawn next year.

Chum salmon enjoyed an active place in Oregon's fishing industry until the 1950's. There was no single reason for the loss of the Oregon chum fishery, Lannan said, but he noted that construction of dams and bridges created migration barriers to salmon and that gravel removed from streams for highway construction damaged spawning grounds.

"By 1961, there was no commercial fishery left on the coast and the Columbia River was not yielding any more than a handful of chum," he said.

Restoring the fish to Oregon is important because chum salmon comprises the world's largest aquaculture-supported fishery. The Japanese release 1.5 billion salmon annually and the Russians release one billion. Most are chum.

About 2 million eggs were taken from the fall chum run of 1980 and used to continue the propagation of the Whiskey Creek stocks. Some surplus eggs were used by ODFW for establishing new Oregon stocks. This year, there was no surplus because of the smaller return. □

Mite fight

A tiny mite that attacks lily bulbs may be pulling the trigger on itself.

To do so, the mite—Rhizoglyphus robini — is getting help from two OSU entomologists, Gerald W. Krantz and G.T. Baker.

"The lily bulb mite is considered an important pest of ornamental lily bulbs both in the field and in the greenhouse," said Krantz. "Since large populations of the pest can be generated early in the growing season, damage to stem and bulb tissue can be severe."

Control of the lily bulb mite is a major priority in most commercial bulb operations because of the value of the lily bulb crop in Oregon and northern California — more than $5 million annually.

"Kelthane, a widely used miticide, is used as a dip or drench for mite control before planting," said Krantz. "Our research suggests that a chemical compound produced by the mite itself may be used to enhance its control."

The compound, citral, is a hydrocarbon produced by the mites in times of stress. It acts as an alarm and causes the population to disperse.

"Adding minute quantities of citral (100 parts per million) to the usual kelthane drench in greenhouse experiments produces significant decreases in bulb mite infestation levels over those observed in bulbs subjected to the kelthane drench alone," said Krantz.

"Also, the reduction in mite numbers appears to occur more rapidly than in bulbs treated with kelthane alone and the mite population remains at a significantly lower level in the presence of citral over periods exceeding two months."

It is possible, the scientists said, that the presence of citral raises the level of mite activity to the point where more effective contact with kelthane is achieved, thus improving initial control.

"Additional experiments are now being conducted to enlarge on our findings," said Krantz. □

Fee could sink grain profits

Congress is thinking of tacking an additional fee on the cargo ships that ply America's inland waterways and, if that happens, it's going to hurt Northwest farmers who sell their goods overseas.

But the type of fee will determine the extent of the damage to Northwest farmers compared to farmers in other areas, according to OSU agricultural economist Mike Martin.

Fee hike proposals include a tonnage tax, a fuel tax, a surcharge on import/export products and a flat user fee, said Martin, who is studying the intricate mechanisms influencing international freight rates from lower Columbia River ports such as Portland and Longview, Washington.

"Being Pacific Northwest oriented, we would like to see Congress impose a flat user fee," said the researcher, explaining that preliminary study results suggest shipping companies would tend to view such a fee as a general operating expense.

Other types of fees, such as a fuel or tonnage tax, might be set up so the tax rate varied with the amount of public money spent to keep particular inland waterways operating, he noted, and that might make the costs higher at lower Columbia ports than at other West Coast ports such as Stockton, California, and Seattle-Tacoma.

"The lower Columbia requires quite a bit of dredging and other maintenance to make it an international shipping lane and the philosophy of the Reagan administration is that users of a publicly financed facility should pay the bill," Martin said.

"Tramp shipping companies operate in an unregulated and very competitive environment. There are no fixed itineraries and ships take on cargo where a satisfactory rate can be obtained. Rate competition is keen and a few cents per ton often determine which vessel receives the cargo," he added.

Because lower Columbia ports dominate grain exports from the West Coast, Columbia Basin grain growers need to pay close attention to new user fee proposals in congress, said the researcher.

"This part of the country relies almost exclusively on the international grain market, so the cost of international transportation is reflected ultimately in the price farmers get for their wheat," he said. □

Ash and cheatgrass

OSU and U.S. Department of Agriculture range scientists are wondering if the ash Mount St. Helens dumped in the Northwest can help ranchers replace low-quality grasses such as cheatgrass with more productive forages.

The research is being conducted on private rangeland about 75 miles west of Spokane, Washington, that received a heavy ash covering during the 1980 eruptions of the volcano.

"One thought is that the ash covering might make aerial reseeding more successful," said Marshall Haferkamp, a range scientist at the Eastern Oregon Agricultural Research Center at Burns.

Haferkamp said test plots on 40 acres owned by eastern Washington rancher Skip Colyer were planted this fall to find out if the soft ash covering in the area, which is about three-fourths of an inch thick, will enhance the establishment of seeds spread on the soil surface (broadcast, in farm terminology) rather than planted with expensive-to-operate seeding equipment.

Objectives of the range study include finding ways ranchers can incorporate the ash into the soil without contributing to air and water pollution by stirring it up. That means finding ways to eliminate cheatgrass and reseed the land with minimum tilling.

Besides studying if the ash covering helps seeds get established, Haferkamp, USDA range scientist Forrest Sneva and OSU range scientist Rick Miller are testing several methods of eliminating cheatgrass, preparing seedbeds and planting.

The cheatgrass removal techniques they applied to test plots include burning, using herbicides and discing. □

Fruitful discovery in Southern Oregon

There may be a relatively easy way to keep immature pears from falling off young trees and get the trees into full production quicker, a study at OSU's Southern Oregon Agricultural Experiment Station at Medford suggests.

An experimental compound with a long name, amino-ethoxyvinylglycine, seems to counteract a growth hormone in pear trees and prevent immature fruit drop, said Porter Lombard, who is testing the compound with fellow OSU horticulturist Daryl Richardson.

Immature fruit drop is a major reason why young pear trees often do not produce commercial quantities of fruit until they are seven to nine years old, explained Lombard, who began spraying young Comice pear trees with the compound in 1980 to test its effects.

The compound shows promise for helping young pear trees reach full production in four to five years and that would make it easier for growers with older, marginally productive trees to clear their orchards and start over with new trees, the researcher said.

"The next step is to get some companies interested in doing or funding research on the compound," said Lombard. "It hasn't been registered for use yet."

Studies in Washington state suggest the compound, a type of plant growth regulator, has a similar effect on other types of pears and on apples but not on stone fruits such as peaches and cherries. □

profile

Success the crooked way

Nan Scott is proof the road to success can be crooked.

She gave up a job teaching English in a South Carolina high school, moved across the country with plans to pursue the same profession in Oregon, instead took a job as a secretary, learned how to use computers and became a key figure in one of the world's largest cereal grain research programs.

Some of the details:

Ten years ago, Scott left a teaching job in South Carolina so her husband, a westerner, could complete his degree in accounting at OSU. Finding no teaching openings in Corvallis, she eventually took a job as secretary to Warren Kronstad, head of an international cereal grain breeding project at OSU.

That's when computers entered her life.

"In our program, we all work in the field," Kronstad said. "When Nan got out there she saw some needs and elected to do something about it."

Studying computers as she went, mostly by taking classes, Scott developed computer programs to help OSU plant breeders keep precise genetic histories of the more than 2 million varieties of wheat and other grains they grow in test plots around Oregon during a typical plant breeding season.

"The significant point to me," said Kronstad, "is that Nan understood the biological aspects of the problems we faced as well as how to apply the computer to them. That's a combination that's not often found."

The problems arose from reams of information plant breeders collect and must draw from season after season during the 12 years it usually takes to produce a new commercial grain variety.

The OSU researchers swap plant genetic material called germplasm with scientists from more than 50 countries and combine, or cross, the germplasm to try and produce better grains. Simply keeping track of the crosses, and successive plant generations, is a numerical nightmare.

One of Scott's computer programs generates special plant labels that help.

"At a single glance the plant breeder can tell why a cross was made, the year the cross was made, the current generation and the locations at which the line was selected," Kronstad said.

Nan Scott

Another computer program she is developing does more.

"It's a diagnostic tool," said Scott. "A wheat breeder can sit down at a terminal and list a set of desired characteristics —resistance to stripe rust and a certain maturity date, for example—and the computer will spit out all the lines of wheat that have those qualities. It helps them avoid wasting time on unprofitable crosses."

The work has not gone unnoticed.

"People were lined up a block last year in Madrid (Spain) to talk to Nan after she gave a talk on how we use the computer," said Kronstad. "The techniques she's developed are being adopted all over the world."

Rewards in agricultural research are coming quicker than they did in teaching, observed the 34-year-old Scott, now a faculty member in OSU's crop science department. But she says she's enjoyed both professions, and the variety switching provided.

Her crooked career path has paid off in another way. It has led to one of her childhood homes, a small town in central China.

"I went there last year when we were in China looking at germplasm and discussing the computer work," said Scott, whose parents, now living in South Carolina, are retired Southern Baptist missionaries.

As a small child, Scott lived in the Chinese town for six months before her family fled to Formosa (where she grew up among Chinese people) to avoid revolutionaries marching south from Manchuria in the post-World War II Communist takeover.

Standing in central China last year, surrounded by smells and sounds that were vaguely familiar and stirred memories of childhood, she felt as if her path has been more circular than crooked, she said. □

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