

Oregon's Agricultural
PROGRESS



Winter • 1955

OREGON STATE COLLEGE • CORVALLIS

Oregon's Agricultural **PROGRESS**

Vol. 2

No. 2

Published four times a year by the Agricultural Experiment Station, Oregon State College, Corvallis, F. E. Price, Director; R. G. Mason, Editor.

	Page
Farm Outlook	2
Features:	
After Wheat, What?	4
Reduce Chemical Spray Drift	6
Special Management Stops Hog Rhinitis	8
For Grower Testing, Research Provides New OSC Tomato Selections	10
New Host for an Old Virus	12
Add Nitrogen to Winter Wheat in Spring	14
Research Briefs	15

Advisory Board: M. H. Becker, extension economist; S. M. Dietz, plant pathologist; P. R. Elliker, bacteriologist; W. G. Nibler, extension agronomist; J. E. Oldfield, animal husbandman.

OREGON'S AGRICULTURAL PROGRESS will be sent free to Oregon residents upon request. Address requests to Bulletin Clerk, Commerce Hall 1, Oregon State College, Corvallis, Oregon, or see your County Extension Agent.

Written material may be reprinted provided no endorsement of a commercial product is stated or implied. Please credit OREGON'S AGRICULTURAL PROGRESS and Oregon State College.

To simplify technical terminology, trade names of products or equipment sometimes will be used. No endorsement of products named is intended nor is criticism implied of products not mentioned.



COVER STORY

OSC animal husbandman Tom Johnson examines one of the experiment station's rhinitis-free hogs. How researchers stopped spread of this disease is told on page 8. (Photo: Jim Hosmer).

OREGON FARMERS are likely to find 1955 much like 1954. With a break from the weather, good managers should make good money.

Many farmers will grow less wheat and more barley; use more fertilizer and less labor; pay higher property taxes and use more credit; make money on some crops and lose on others.

Even so, 1955 should be another fairly good year for farm prices and income. It's not likely to be the best nor the worst year in history.

It should be a fair year for farmers largely because it should be another year of high consumer income and spending. Money in the hands of consumers makes markets for farm products.

Business

Business activity, spearheaded by a continuing construction boom, is entering the new year in high gear. Possibly businessmen are now too optimistic, just as many were too pessimistic a year ago. Yet, the year ahead should be another good one for most of them.

As 1954 ended, new orders for factory products were coming in faster than they were being filled. That means more jobs, more working time, and more money in city buyers' pockets for a while at least. This is favorable but it does not mean prosperity for farmers. Instead, it means prices will stay high for most of the things farmers buy. It will not keep prices received from declining if production increases much.

Farming

Finally, this means that the farm price squeeze is not likely to change much in 1955. The parity ratio, which measures this squeeze nationally, dropped to 87 in the fall of 1954. That was about 4 per cent below a year earlier, and the lowest since 1941.

During the past 3 years, we have been in a period where farm production has increased faster than domestic and foreign demand. This has led to lower prices and bigger stocks of storeables. The manufacturers' inventory problem may have been relieved during the past year, but the stock problem is still with us in agriculture.

With demand in 1955 expected to be much like 1954, changes in stocks,

Farm Outlook

by Agricultural Economist M. D. Thomas

changes in production, and changes in government programs are likely to dominate farm price trends in the year ahead. Watch for these changes, and take advantage of them in planning your production and marketing.

Cattle

The year 1954 saw comparative price stability for cattlemen, and 1955 should be much the same with no sharp ups or downs.

Fat cattle may average a little lower during the first half of 1955 than dur-

ing the same months of 1954. At the same time, Oregon stocker and feeder cattle should show better price comparisons during the first few months of the year. By next fall, feeder cattle could bring less money than this past fall—only bumper hay and feed crops or a real business boom could brighten this outlook.

The nation's cattle numbers have reached the peak of another cycle. Marketings in 1954 probably exceeded the number of calves raised. This winter's count should be a little under

last year. Even so, little decline in marketings is likely in the next 2 or 3 years. Large marketings, plus the buildup in pork, will keep beef prices under pressure for a while.

Hogs

The hog price decline that started in 1954 will continue into 1955 and probably for another year or two. Pig numbers will increase again in '55 but the increase may not be as great as in 1954.

We are entering a period of below average returns from hogs. Later, hogs may make good returns from barley, and even from wheat, as prices of these crops work lower.

Lambs

Lamb prices probably will repeat the '54 pattern in 1955. Price improvement will have to wait for a rise in beef prices. Try to get lambs in good shape for May and June markets.

Wool

Wool returns have been promised a boost through the new government price incentive program aimed at increasing wool production. Actually, the government bonus will not reach sheep owners until sometime in 1956.

(Continued on page 16)



GET LAMBS into good condition for May or June markets. Government price incentives also promise to boost wool returns. Although bonus won't reach wool growers until 1956, keep '55 receipts handy.



WHEAT FARMERS don't plan to put diverted acres in grass and other crops that will tie up their land.

After Wheat, *What?*

Although "cross compliance" regulations won't apply this year, they can be used later. How wheat-fallow farmers in the Columbia Basin plan to handle diverted acres under cross compliance is reported in this story.

COLUMBIA BASIN wheat growers face some tough farming decisions if acreage allotments continue. Although diverted acres won't be much of a problem in 1955, crop-limiting restrictions, or "cross-compliance," is a possibility in the future.

How farmers size up their land-out-of-wheat problem and how they plan to handle it was found in a survey recently by agricultural economists W. B. Back and H. H. Stippler. Some 126 farmers in the wheat-fallow area were interviewed. The economists' findings

do not apply to any particular farm, but do give a picture of farmer-thinking. Now, Back and Stippler are assembling material useful to individual farmers for making decisions on the best way to handle these acres.

Six cropping alternatives

Without cross-compliance, farmers in the summer fallow-wheat area could use land taken out of wheat by:

1. Growing feed grains (barley, oats, rye) as cash crops or as feed for farm use.

2. Growing other cash crops, such as grass seed, safflower.

3. Growing small grains for hay or pasture.

4. Seeding land to grass or legumes for pasture or for conservation.

5. Letting the land lie idle in stubble or double summer-fallow.

6. Using some of the above in combination with livestock.

In 1954 about 85 out of every 100 acres taken out of wheat went into barley. From his survey, Back figures about the same thing will be repeated in 1955, which shows that farmers rank barley number one as an alternative to wheat.

Barley brings most money

There are several reasons for this. Mostly, farmers get more money from barley than from any other crop except wheat. Barley is handled about the same as wheat and takes the same equipment. Also, farmers can shift easily back and forth between wheat and barley.

But barley growing is limited under cross-compliance. What would farmers do then? One main purpose in the researchers' survey is to answer this question.

Last September the Secretary of Agriculture removed cash-crop growing restrictions or cross-compliance regulations for the 1955 crop year. Future cross-compliance enforcement is still a possibility, and farmers are studying some of the other ways to use land besides sowing to barley and wheat. Cash crops other than barley and grain, such as grass seed and safflower, were hardly considered by farmers interviewed, although they, too, could be limited under the compliance provisions of the allotment program.

Few planned far ahead

With this situation facing farmers, the researchers found few planning beyond next year's crop, and some weren't sure about this year's. The main reasons cited: under uncertain acreage allotments there's a chance farmers may be permitted to grow more wheat; also, farmers weren't sure which alternative would best replace wheat.

Close to farmer uncertainty, Back and Stippler report farmers wanted to

remain "flexible." That is, they wanted to shift easily from one crop or type of farming to another with little cost. Year-to-year farm planning is a characteristic of flexibility.

Before cash-crop restrictions on the 1955 crop were removed, more than half the wheat growers had planned to seed all summer-fallow land to wheat, using the over-allotment for hay and pasture. Another one-fourth planned to leave their land idle, or double summer-fallow. Few planned to seed grass.

Not interested in grass

Farmers interviewed considered grass only if forced to it through compliance provisions of the control program. Less than a tenth were interested in sowing grass on wheat land. Nearly half, however, said they would seed some grass if they were sure allotments and compliance would definitely continue. Even so, they said they would seed least productive land, or land most expensive to operate. None was interested in wheat-fallow-grass rotation.

Thus, Back and Stippler conclude that grass seeding—an important soil conserving item in the summer-fallow wheat area—is not likely to take place until farmers are more sure wheat-growing limitations aren't going to change.

Farmers with large acreages, however, favored grass sowing more than those with small amounts of wheat land. Small-acre farmers gave grain hay and grain pasture higher ratings

as cropping alternatives than did farmers with large acreages.

Livestock farmers rate grass high

Farmers with beef cattle rated grass, grain hay, and grain pasture high as an alternative to wheat, compared to farmers without livestock. Livestock was considered by folks with stock the only practical way to market some of the crops which could be grown on land out of wheat, and the difference amount to income or no income from diverted acres under crop limitations.

But Back interviewed many farmers who did not handle livestock nor have the buildings, fences, or equipment for them. Money to buy these facilities drastically limits the opportunities for livestock operations on many wheat ranches.

A little figuring by the economist shows that cattle and grass are the best income-producing alternatives under compliance, if a farmer has livestock facilities and range land. Without these items, cattle and grass as alternatives rank last.

Based on current cattle prices

This figuring is based on current cattle prices, which Back says may be low for judging livestock as an alternative. But under current conditions, farmers without range or livestock facilities must receive about \$20 per hundredweight if cattle and grass are equally as "profitable" as letting diverted acres remain idle.

So, for farmers without livestock-handling facilities, and possibly no income from diverted acres, many considered only the cheapest way out.

Seeding grass is expensive—and so is double summer-fallow. Idle land in stubble can create an expensive weed problem. But in general, most farmers thought idle land in stubble was the least expensive. About 3 out of 10 figured that is how they would handle their diverted acres when not permitted to grow cash crops.

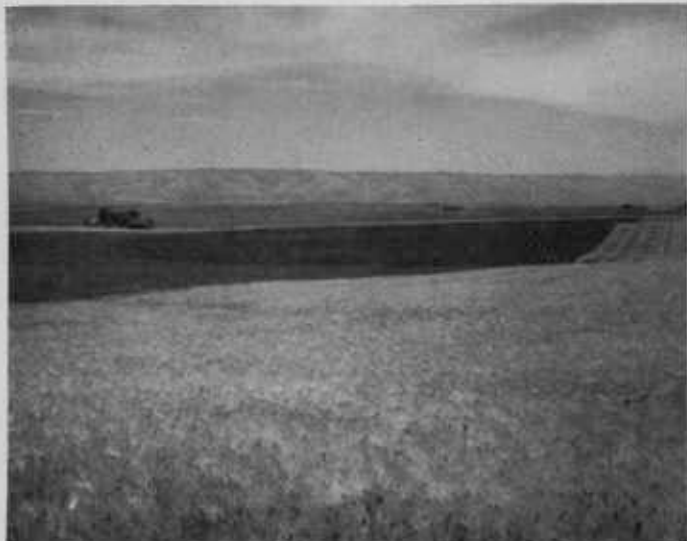
Handle problem three ways

From their survey, Back and Stippler predict farmers will handle their diverted acre problems three ways, assuming acreage allotments will continue:

1. Most diverted acres will be sown to barley, if permitted by the allotment program.

2. For the next 2 to 3 years, farmers will not "stick their necks out" and get into grass and other crops which will keep their land tied up for more than a year. Under cash-crop growing restrictions this means grain hay, grain pasture, double summer-fallow, and land idle in stubble for most of the land taken out of wheat. Some grass will be seeded to land that's rough, thin, washy, or not productive.

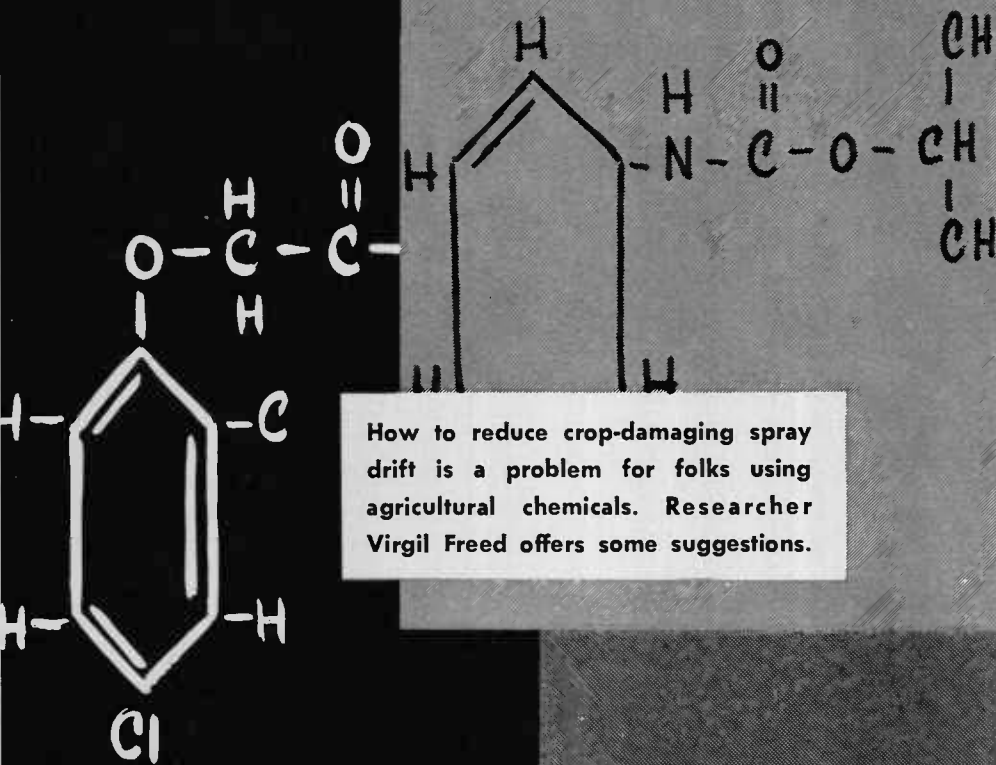
3. Staying in this flexible position will become less important if the allotment program continues beyond 2 to 3 years. Thus, as time goes on, more and more wheat farmers will become interested in grass and livestock.



BARLEY ranked first as a planting alternative to wheat. Fast-growing barley rimming wheat acreages will be common in the Columbia Basin this year.

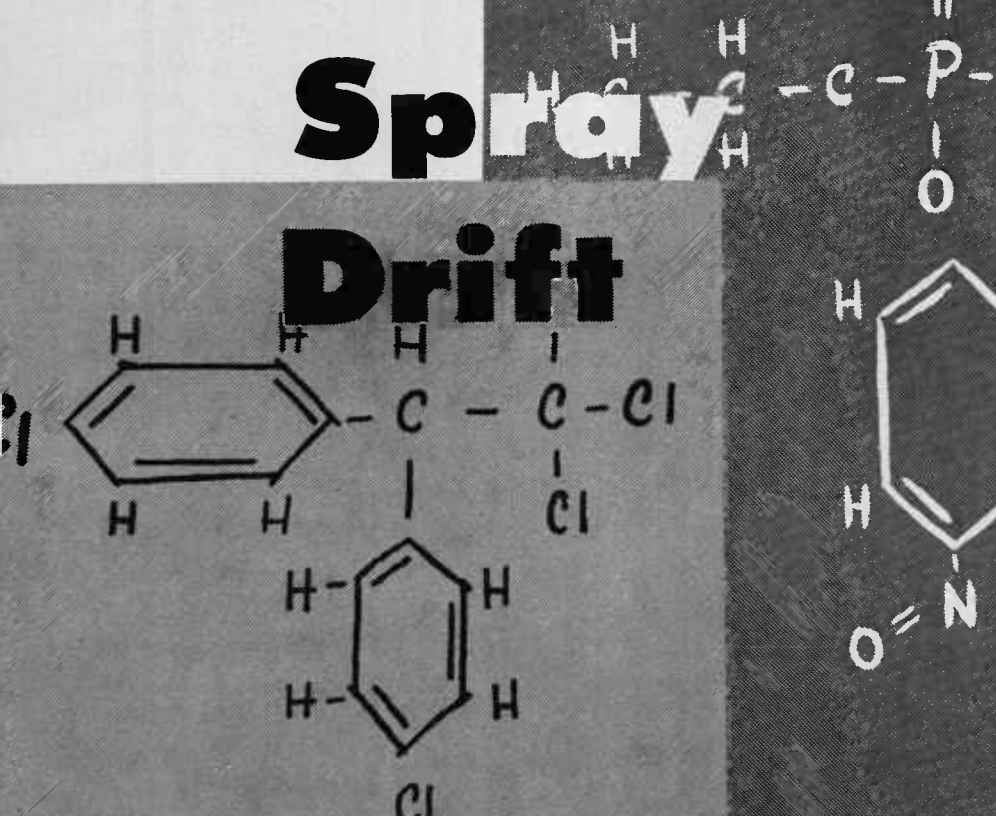


BEEF CATTLE ranked second as a wheat alternative with farmers owning range and livestock-handling facilities. With others, cattle raising ranked last.



How to reduce crop-damaging spray drift is a problem for folks using agricultural chemicals. Researcher Virgil Freed offers some suggestions.

Reduce Chemical Spray Drift



HOW CAN FARMERS or applicators prevent chemical drifts or vapors (the chemical turned gas) from damaging crops or livestock?

Most trouble has come from hormone weed killers, 2,4-D and 2,4,5-T. Law suits by irate farmers attest that damage has resulted. And it's even difficult to say if damage could have been avoided, since careful, experienced applicators have had trouble.

Understanding drift and volatility problems can help reduce the damage bill tremendously, thinks agricultural chemist Virgil Freed. And he cites some of his research figures to show how far damaging material can travel.

Let's look at spray drift first. Freed says this probably is the greatest source of danger. Why? Consider some basic laws of physics.

Everyone knows that gravity forces objects to fall earthward. But a pound of feathers will fall slower than a pound of lead. Reason: compared to their weight, feathers take up more room, thus air resistance slows their fall. Therefore, air resistance—and a slower fall—result as the surface area of an object gets larger, although the weight remains the same.

Air resistance aids drift

Air resistance plus weight differences are important when fine spray droplets or dust particles are released. To give some idea of particle size and how far it will drift, consider these figures:

An average spray droplet is about 200 microns wide. About 127 stacked side by side measure an inch. A drop this size will fall about 238 feet a minute. But a particle one-fourth this size—like a fine spray—will fall only 14.9 feet per minute—less than one-sixteenth as fast.

Now suppose these sized drops were released at a normal spraying height of 2½ feet with a wind blowing 4 miles an hour. How far would they drift before striking the ground?

The larger drop would drift about 3½ feet, the smaller one nearly 59 feet, or nearly 16 times as far!

Also, churning air currents are important (and not included in the figuring) since they may lift droplets and carry them even farther. Sometimes water in the droplet evaporates at the droplet surface, thus lowering the weight and encouraging a further drift.

Tiny spray droplets can still damage susceptible plants after they've drifted. For example, 10 of these tiny droplets will visibly affect plants such as tomatoes and grapes.

Chemical vapors also damage

Chemical vapors are a second source of damage, since plant- and animal-killing properties are contained in the gas, and can be blown by wind currents to nearby fields, barns, and houses.

Freed says not all of these chemicals present this problem. But two he's tested do. They're the esters of 2,4-D and 2,4,5-T.

The tendency for any chemical to turn to a gas is measured as its vapor pressure. For example, here are the vapor pressures of 4 esters:

Ester	Vapor Pressure at 74° F.
Isopropyl 2,4-D	11.9
Butoxyethyl 2,4-D	0.8
Isopropyl 2,4,5-T	4.1
Butoxyethyl 2,4,5-T	1.5

The butoxyethyl esters, being lower in vapor pressure, don't tend to change to a gas as fast as the isopropyl esters. However, just because a product is low in volatility, don't forget it still vaporizes, says Freed.

For example, the researcher placed the two 2,4-D esters in separate cups and weighed them. Later, the cups were reweighed to find how much material turned to a gas:

Ester	Per Cent Loss at 68° F.	
	24 hours	48 hours
Isopropyl 2,4-D	1.33	4.43
Butoxyethyl 2,4-D	1.77	3.90

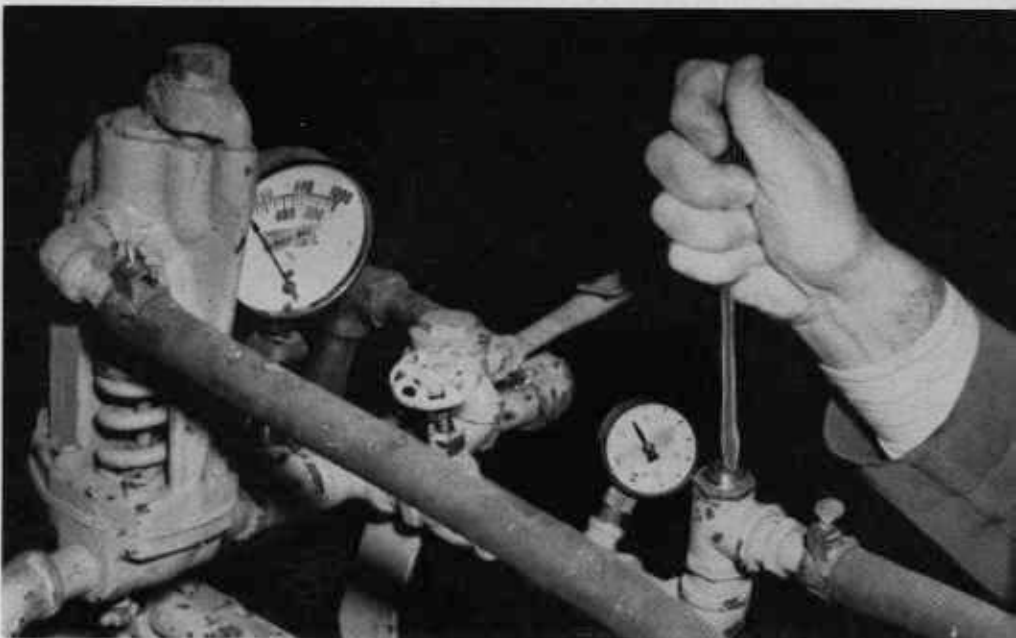
Once a chemical turns to gas, it travels all directions, including upward. This helps dilute the chemical's killing power, and winds dilute it even more. But within short distances, these vapors are strong enough to cause considerable damage, says Freed.

Summing up his findings, Freed suggests the following:

1. Spray only on calm days.
2. Use nozzles that deliver a large-sized droplet, and only enough pressure so the nozzle operates properly. Under most conditions this means a pressure of 20 to 40 pounds per square inch, with each nozzle fixed to deliver not less than 1 quart per minute.
3. Use nonvolatilizing materials whenever possible.



2,4-D DRIFT DAMAGE in grapes is examined by Norton Taylor, Umatilla County extension agent. Proper adjustment of spray rig plus spraying only on calm days will help minimize drift damage.



ABOVE, adjust pressure to 20 to 40 pounds per square inch. This is usually low enough so nozzles operate properly. BELOW, use nozzles that deliver a large-sized droplet, or about 1 quart per minute.



When rhinitis broke out in OSC's swine herd, researchers worked out a way to keep it from spreading. They found . . .

Special Management Stops

Hog Rhinitis

YOU CAN keep hog rhinitis from spreading to baby pigs by following seven management steps worked out by OSC animal husbandmen T. K. Johnson and J. E. Oldfield, and veterinarian J. F. Bone.

Hog rhinitis (sometimes called atrophic rhinitis) is a profit-cutting disease that encourages higher deaths from respiratory diseases, such as pneumonia. Also, affected shoats don't grow well and may fatten poorly. Badly infected pigs may take 1 or 2 months longer than normal, healthy pigs to get to market weight.

Disease shrinks nasal bones

The disease withers and shrinks the small, coiled, turbinate bones in the hog's nasal cavities. Eventually these bones disappear. Since they normally warm and filter air breathed into the lungs, they're important in preventing pneumonia and other respiratory diseases.

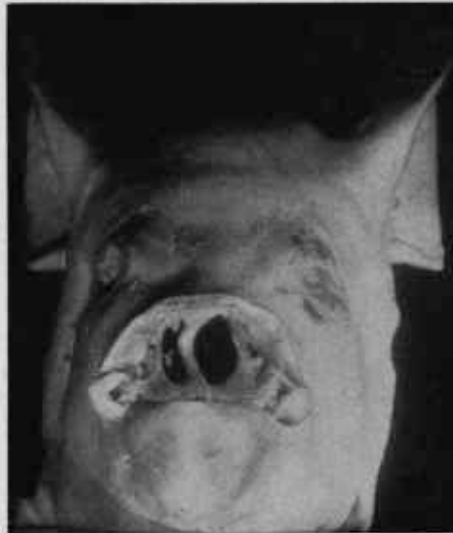
Scientists don't know the cause of hog rhinitis. They've advanced several theories, but no responsible bacteria or virus has been isolated and identified.

Practical control method developed

OSC researchers have concentrated on finding a practical method of controlling the disease. After 2 years of work, they report the following steps will help you raise clean, rhinitis-free pigs from infected parent stock.

Here are their suggestions:

1. Thoroughly disinfect the farrowing pen with a lye solution made up



RHINITIS-INFECTED hog's nose looks this after slaughter. Note missing small, coiled nasal bones.

of 1 can of lye to 15 gallons of water. Bed the area with clean straw just before farrowing.

2. Scrub the sow with a detergent solution. Be sure to scrub the udder and genital region.

3. Place lye footbaths (1 can of lye to 15 gallons of water) before the farrowing pen entrance. This keeps you from spreading the disease with your boots.

4. Wear freshly washed and ironed clothing and gloves at farrowing. Catch each pig at delivery, and pen it in a warm brooder where it cannot touch the sow. Afterbirth—the protective

membrane that covers the unborn pig—also is expelled at birth and should be removed from the pen immediately.

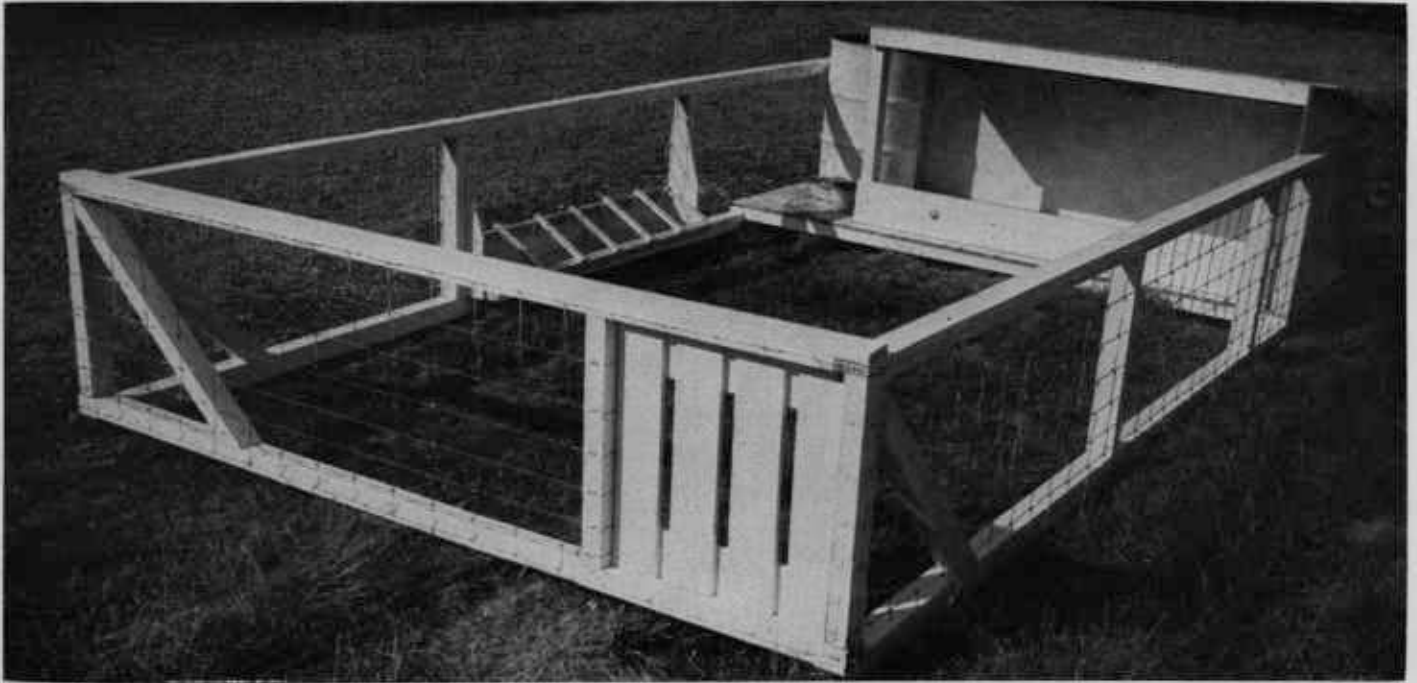
5. After farrowing, wash the sow's udder with a mild disinfectant. Then bring the baby pigs to nurse. *Make sure the pigs do not get near the sow's nose.* After the pigs have finished, return them to the brooder. Let the piglets nurse two or three times the first 24 hours, allowing no contact with the sow except at the udder.

6. After final nursing, remove the baby pigs to isolated, disinfected quarters away from the hog barn and raise to "weaning" (6 weeks) age on synthetic milk. Complete synthetic milk feeding suggestions were reported in the Summer, 1954, issue of *Oregon's Agricultural Progress*. Baby pigs begin on dry starter feed at 3 weeks and may be on full dry feed at 6 weeks.

7. When the pigs are taking dry feed well (about 6 to 7 weeks), move the young animals to a pasture where no hogs have run for several years. Pens, mounted on skids so they can be moved from place to place, help give the pigs daily use of fresh, clean ground.

Although these suggestions seem labor- and time-consuming, tests so far indicate they will work. Further testing is under way. The researchers point out that following these steps costs less than following the old recommendation—that of slaughtering a herd, then bringing in new stock.

Rhinitis control is particularly im-



PORTABLE HOG PENS, skid-mounted, help give pigs daily use of fresh, clean ground. Clean pasture is essential in stopping spread of atrophic rhinitis.

portant to purebred breeders. Many have spent years and dollars in building up valuable, highly efficient bloodlines, and slaughter would wipe out strains which could never be replaced. Also, it's difficult to diagnose atrophic rhinitis in living animals, and you would have no assurance newly purchased animals were free of the disease.

Seemingly healthy animals often are carriers, and this may not be known until a whole herd is infected. Rhinitis is usually brought in by new breeding stock. After a few months, persistent sneezing—more than that needed to blow dust from nostrils—appears among suckling pigs. As these shoats grow and the disease progresses, bloody mucus drips from nostrils dur-

ing these sneezing spells. Later, the snout may gradually twist to one side or become shortened, giving the pig a wry-nosed or dish face look. By the time this nose distortion appears, the disease usually is well established within the herd.

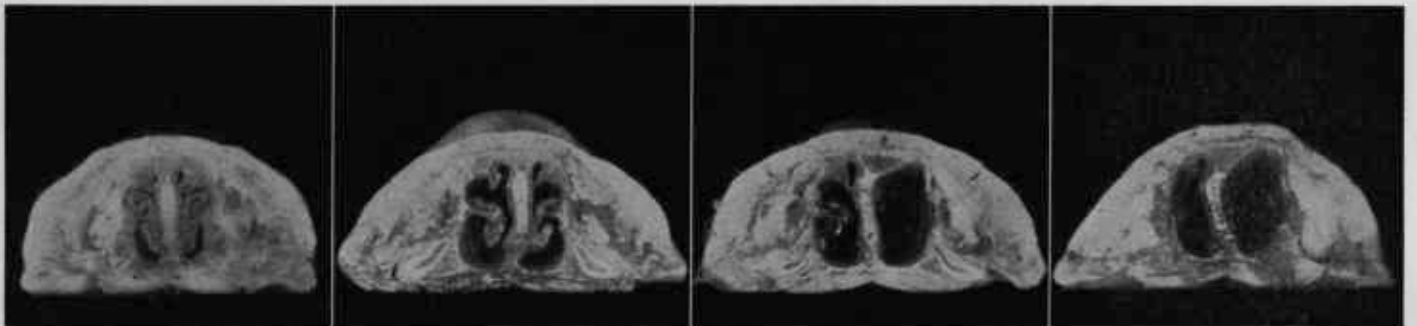
Pigs cough more

There's another symptom that gives early warning of rhinitis, say the researchers. They report afflicted suckling pigs cough more than usual, especially when weather and management are ideal. The cough suggests pigs may have pneumonia, and this probably is the cause of higher than normal preweaning deaths that plague a herd afflicted with atrophic rhinitis.

Proof that hogs may or may not

have the disease can be made by a veterinarian at slaughter time. He usually examines a hog's nasal cavities, and those with damaged or shrunken bones have the disease. Once clean animals have been raised to breeding age, slaughter the old, infected stock and disinfect their quarters before clean animals are brought back.

Johnson, Oldfield, and Bone admit their 7-step management method takes a lot of time and labor. But it's not expensive, and it's better than the usual control method of complete herd slaughter. Also, they think it will better preserve valuable bloodlines in purebred swine herds, and may help the hog industry by furnishing rhinitis-free foundation stock to commercial growers.



ESSENTIAL NASAL bones slowly disappear over several weeks. Bones filter and warm air. Without them, hogs suffer more from respiratory diseases.

For grower testing . . .

NEW SELECTIONS noted for earliness will be grower-tested this year . . .



. . . but research has yet to develop tomato resistant to fruit cracking.



. . . research provides

New OSC Tomato Selections

NEEDED: a new tomato variety that's early, medium large, deep red, smooth, solid, highly resistant to curly top virus, late blight, and Verticillium wilt, resistant to fruit cracking, and possesses excellent ability to set fruit at low night temperatures.

Coming: selections with many—but not all—of these characteristics.

Selections ready for testing

Horticulturist W. A. Frazier says limited amounts of trial seed of at least three OSC selections will be distributed to County Extension Agents and branch experiment stations this spring. Seed sent to agents will be re-distributed to selected growers for plant observation.

The researcher points out that such tests are the only way of finding local adaptability of the various selections. Those showing promise may be named and released later.

Three of these OSC selections set fruit early in the season and at low night temperatures. They produce a heavy tonnage of early, ripe fruit. Selections this past year averaged about 5 tons of tomatoes by September 16, doubling the tonnage of the old favorite, Stokesdale. (See table.)

Most of the new selections are smaller-fruited, and not too solid, therefore there's some loss in quality. They need plenty of water and fertilizer, and are susceptible to late blight and other tomato diseases.

Selections take several years

How did Frazier get these selections? It took several years, because tomatoes are self-fertile, thus continual plant selection is needed. By self-fertile, Frazier means that pollen from one flower naturally pollinates the female part of the *same* flower. It was the painstaking job of the researcher

to cross, by hand, pollen from one variety to the female flower part of another variety. Seeds from this hybrid were planted to eventually get promising selections.

But just one year's planting of the first cross wasn't enough. The researcher selected seed only from the few plants that had the visible characteristics he wanted. Another planting and another selection followed, and was repeated twice more. Finally, after about 5 generations (and 5 years) from the original cross, promising selections are now ready for test in other parts of the state.

Hybrids may yield ideal tomato

Up to now, these selections have been planted at Corvallis, at one branch experiment station, and by a few growers. But their worth as a possible new variety in other areas or as "in-

bred lines" for further crossing will be known only after statewide tests.

First-cross hybrid varieties (seed from the hand pollinating of two "inbred lines") may be the answer for the ideal tomato needed in Oregon, thinks Frazier. But parents, or inbred lines, for this ideal combination have not yet been developed. The potential yielding ability of hybrids over commercial varieties or selections is shown in the table, where they more than tripled Stokesdale and yielded at least a ton above the new OSC selections at the early September 16 date. Seeds of these promising hybrids are being used for further research.

The horticulturist is hoping to find a tomato which will produce well in the coastal area where moist conditions lead to blight damage. New Hampshire researchers have released a blight-resistant selection that might work here.

A tougher problem is curly top virus, which has perennially scourged tomato growers in eastern Oregon. Frazier says wild tomatoes have been the only good source of curly top resistance, but their combination or hybridization with commercial types brings in so many undesirable characters that resulting hybrids simply "haven't got it."

U. S. Department of Agriculture and experiment station researchers in Washington, Idaho, Utah, and California are working on this problem.

Rains crack tomatoes

September and October rains crack tomatoes, thus lowering their market quality. And Frazier predicts it will be several years before his breeding program gets around this one.

The researcher reports that the genetic reasons for cracking are complex, and single-cross hybrids now do not possess the resistant characters needed. Leland Hudson, one of Frazier's graduate students, found that both parents must be resistant, and two good parents are not yet available.

Frazier does have four promising sources of cracking-resistant tomatoes, but more work is needed before this resistance can be combined with the other things Oregon growers need in a tomato.

Current varieties recommended

Until better varieties are available, the horticulturist reports several old

standbys plus some newer hybrids have shown up well in tests at Corvallis.

Among the old varieties are Stokesdale, John Baer, Valiant, Pritchard, and Wasatch (Moscow). New ones worth trying are Red Jacket, a "potato leaf" variety, and Queens, which matures about the same time as Stokesdale and possesses unusually good fruit firmness.

Some good hybrid releases also have tested well. These include Burpee Hybrid, Early Giant Hybrid, Fairbo Hybrid E, Moreton Hybrid, and Vancross.

The high vitamin C tomato—Doublerrich—is moderately early in Oregon, and fruits are medium sized. Loran Blood, a Verticillium wilt-resistant variety, is late maturing, but promising to growers who need wilt-resistant tomatoes.

Selections, Hybrids High Yielders in 1954 Corvallis Tests

Variety	Tons Per Acre	
	September 16	October 2
OSC Selection 201	4.9	11.5
OSC Selection 228	5.8	12.1
OSC Selection 230	4.7	10.6
Hybrid Pennheart x Pearl Harbor	6.5	15.5
Hybrid OSC Selection 54 x Marman	6.5	14.6
Stokesdale	2.4	7.9



OSC HORTICULTURIST W. A. Frazier examines an OSC selection (left) that sets fruit early, compared to standard variety. Picture snapped September 16.



HYBRID lines Frazier is testing include one for large size, cracking-resistance, and earliness. One problem is combining into one variety.



CENTRAL OREGON potato grower checks for leaf curling, a symptom of late-breaking virus. Disease usually hits in August, wilting plants and tubers.

Central Oregon potato growers weren't sure what had hit their spuds three years ago. Now, a team of OSC researchers say it's a . . .

New Host for an Old Virus

AMOWER CHEWED across a Jefferson County Ladino clover field one June day in 1951, snipping foot-high forage for the area's first hay cutting.

As usual, the crop looked good, and so did the neighbor's nearby potatoes. Under irrigation, it looked like you could grow most anything.

But by August many of the neighbor's potatoes were wilting and dying, and affected plants produced only a few wilted tubers. This same story was being repeated in many potato fields in central Oregon's newly developed irrigation districts.

Alarmed growers brought in OSC's plant pathologists J. A. Milbrath and W. B. Raymer, and entomologist Clark Amen to explain what happened and what to do about it.

Insect precedes virus

After 3 years work, the researchers know how the crippling disease—a virus—spreads, and which insect is responsible, but have yet to work out practical controls, although they do have some control suggestions.

The virus, named "late breaking" virus, is similar to Aster Yellows virus. The disease was found many

years ago on asters—turning them yellow.

Actually, a few potato growers had been plagued with this virus in 1945. These were certified seed growers, and the late breaking virus kept many seed-virus disease ratings above the 2 per cent tolerance level for certified seed. This disease, so troublesome to seed growers, didn't affect others until the 1951 breakout.

Most of the growers had planted certified seed, so the researchers were sure the virus hadn't started that way.

A check of clover fields revealed many plants showing virus symptoms,



LADINO CLOVER flower heads turn leaf-like when late-breaking virus strikes plants. Normal flower shown at left; infected flowers, middle and right.

such as small, often rosette-like plants, and leaves growing out of seed heads, giving these heads a plant-cluster look.

Then the researchers found many leafhoppers known to spread Aster Yellows virus were in nearby Ladino clover plantings. One kind—the six spotted leafhopper—was found in large numbers, and Amen's greenhouse tests proved it transmitted the disease from infected clover to healthy potatoes.

Insects migrate to potatoes

Leafhopper numbers were their greatest in June—about clover-clipping and potato-emerging time. The researchers figure clover harvesting stirred the insects until they migrated to the nearest feeding ground, usually potatoes. That way, the virus spread from host plants to potato fields.

Other plants besides Ladino clover also host the virus. These include red

clover, and weeds such as wild lettuce, fleabane, and wild mustard.

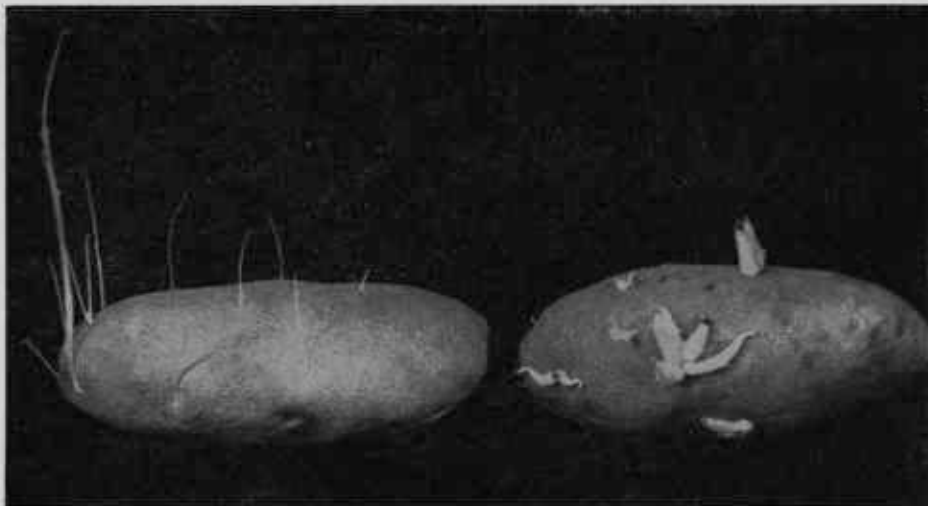
The researchers haven't found a practical control. If all Ladino clover seed growers also raised potatoes, they could dust their clover for leafhoppers. But many do not raise potatoes. Dusting insecticides on potatoes did little good in reducing virus damage, since it took only one feeding per leafhopper to inject the virus into the plant. Insecticides kill plant-sucking insects after they have fed. The other possibility is to delay potato planting so plants will emerge after the first clover cutting, but with early frost danger there's no assurance this will work either.

Insecticides work on clover insects

Insecticides sprayed on clover fields may work, and two—methoxychlor and perthane—will kill leafhoppers before they migrate to potato fields, and are



CHINA LETTUCE, a weed, also hosts the virus. Normal plant right, virus infected plant at left.



VIRUS-INFECTED tuber at left sprouts fine hairs during storage, compared to normal tuber at right. When planted, infected tubers produce small, weak plants, OSC researchers report insect carries virus.

safe to use close to clipping time.

The year 1954 saw a reduced virus problem because low Ladino clover seed prices had forced many farmers to switch to other crops. Also, many farmers dusted for the clover seed midge last spring (see *Oregon's Agricultural Progress*, Spring, 1954) which reduced insect numbers.

But potato growers will still face late breaking virus. If Ladino clover seed prices and plantings climb again, the problem could become more acute, and by then the researchers hope to have more practical controls worked out.



Take some of the guess work out of Farming—

Guessing can spell the difference between profit and loss.

You can take a lot of guess work out of farming when it comes to fertilizing. How? *Have your soil tested.* Your County Extension Agent will provide containers for soil samples, and suggest the best sampling method.

Then, the Oregon State College Soil Testing Laboratory takes over.

If you farm in western Oregon, a soil test will indicate your soil's acidity, lime requirement, and amounts of phosphorus, potassium, and calcium available for crop use.

For eastern Oregon farmers, you'll find how alkaline your soil is, and the amounts of available phosphorus, potassium, sodium, and salts. A small fee is charged for either of these two groups of tests. Also, organic matter or boron amounts can be obtained.

These test results, coupled with recommendations from your County Extension Agent, can guide your purchases for the right amount of the right kind of fertilizer for this year's crop.

A Soil Test Pays!

See Your County Agent

Add Nitrogen to Winter Wheat in Spring

SPRING IS THE BEST TIME for Willamette Valley winter wheat farmers to add nitrogen.

Fertilizer trials during the past 2 years have shown little yield increase from a fall application. But up to 60 pounds of actual nitrogen per acre in the spring have boosted yields as much as 25 bushels, according to OSC soil scientist Tom Jackson.

Nitrogen rate varies

The researcher adds that the nitrogen rate will vary according to past cropping. A previous legume crop will leave much available nitrogen in the soil. But if you had raised a grain or grass seed crop the season before, more nitrogen would be needed to help break down straw.

Under average conditions of good soil drainage, plus good fall growth, Jackson found that winter wheat following a legume usually needs about 20 to 30 pounds of actual nitrogen per acre. Following grain or grass, 50 to 60 pounds is needed. Lodging wasn't a problem on test plots scattered up and down the valley, where yields varied from 10 to 15 bushels per acre to an occasional 85 to 90 bushels.

Jackson reports fertilizer applications must be timed so spring rains will carry the nutrient to plant roots. About the first of April usually is a good time.

Fall applications don't pay

Fall applications didn't pay off under average fertility conditions. Main benefit was in getting good crop establishment, and in plants remaining healthy throughout the winter.

This doesn't rule out fall nitrogen applications, however. Low yielding wheat fields (20 bushels per acre or less), with plants that do not stool, need about 20 pounds of fall-applied nitrogen to maintain plant health throughout the winter.

Jackson found some soils low in phosphorus—low enough to limit yields. Most of these were hill soils. A soil test is a good measure of possible phosphorus needs, and the material should be applied at planting time. Up to 40 pounds of phosphorus per acre usually is enough. Few wheat-growing soils needed potash, but some needs

showed up in western Oregon. Again, a soils test is a good indicator.

Winter wheat is grown on most well-drained valley soils, such as the Willamette series, plus many hill soils. Most of these hill soils are the "red hill" type in the Olympic or Aiken series. Good drainage is the primary requirement for good winter wheat production, says Jackson. Soils also must be fairly deep to store enough moisture to supply the crop when hot summer weather takes over.

These fertilizer recommendations are based on trials located on different farms in the Willamette Valley. For the past 2 years, Jackson has worked with farmers in setting out some 40 of these tests. The researcher figures fertilizer recommendations can best be made after different kinds and rates have been tested *under actual farming conditions.*

All operations except those of applying fertilizers and harvesting the crop in the small test area are farmer-completed. The farmer prepares the seedbed, and plants the crop as part of his regular field operation. Then a small test area is staked, and fertilizers applied.

After harvesting, yields are recorded and analyzed, and results reported to County Extension Agents where fertilizer recommendations would apply.

Besides wheat, Jackson has completed tests on grass seed, oats, barley, and pasture.

Hessian fly, root rots problems

Besides proper fertilizer applications, entomologists and plant pathologists point out two other problems facing Willamette Valley winter wheat farmers. One is the Hessian fly; the other, root rots.

Hessian fly can be controlled by late planting. But don't always go by the calendar as a safe planting guide. For example, a dry fall like 1952 meant a late fly hatch. Waiting about 2 weeks after the first fall rains—and at least after October 15—whichever is latest, is suggested.

Crop rotation has been the main method of controlling root rots. Don't follow winter wheat with winter wheat—especially if there's a slight root rot infection showing up in this year's stand.

Research Briefs

Dusting Early Controls Clover Root Borer

Rain Beetles Killing Sweet Cherry Trees

Dusting Red Clover Early Promises Root Borer Control

CONTROL of the clover root borer, a relative to the bark beetle that's causing trouble in Oregon forests, promises to increase the state's red clover seed and hay production.

OSC entomologist E. A. Dickason reports after 5 years' testing, that early applications of aldrin or heptachlor will keep the borer from killing red clover plants.

Insects limit production

Red clover seed production in many parts of Oregon has been limited to

one year because of the insect. Adults attack the plant the spring following seeding. They move in during the mild weather in April, May, and June, when eggs are laid in the plant crown. Tiny larvae hatch, then tunnel in the roots. They complete their growth within the root and emerge as adults the following spring.

Injured roots may die during the warm summer of the seed crop year, or perhaps survive until the following spring. In either case, infested fields are severely thinned, usually killing

out the second year's seed crop.

Dickason has found that either of these insecticides applied at 2 pounds of actual ingredients per acre will effectively control adults when they visit new stands in the spring. The researcher says an early application is important, since it must be completed before adult flights, usually by early April. Also, an early application avoids leaving a possible harmful residue on the forage. The material works best when it's applied as a dust with a ground rig.

New Rain Beetle Kills Sweet Cherry Trees; Life Cycle Study May Suggest Control

RAIN BEETLES now are killing sweet cherry trees near The Dalles.

Floyd Ellertson, entomologist at the Mid-Columbia branch station, reports they have been the main cause of death for 25 sweet cherry trees. (A different species, which attacked apple trees near Hood River, was described in the winter 1954 issue of *Oregon's Agricultural Progress*.)

This new species, *Plecoma oregonensis*, first was reported near Wasco in 1908. Up to 1954 there was no record of it harming fruit trees.

Grubs scour roots

In June, 1953, these 20-year-old cherry trees had borne a full crop. From July to November, they dropped in vigor, eventually dying. Last spring trees were pulled, and root systems showed the severe scouring of rain beetle larval feeding. Grubs were found at different soil depths—varying from 10 to 37 inches.

These rain beetles are different from the species reported last winter. First, says Ellertson, grubs of the new species scour roots deeper and feed deeper in the soil. Adults have a black thorax and brown wing covers, just the reverse "two tone" of the Hood River type. And they seem to be more widespread, since the entomologist recently

found some in the sagebrush area along the John Day River.

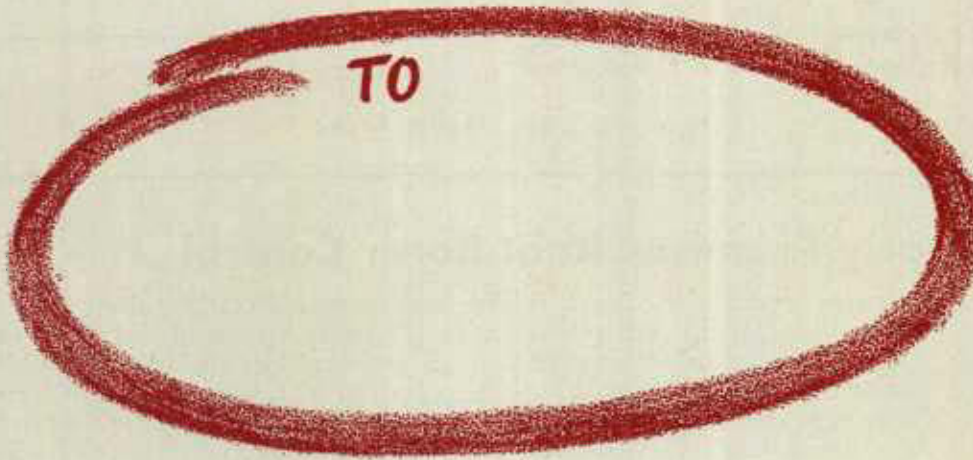
Ellertson believes they're just as ancient as the Hood River types, too. Up to last year, the beetle had been a collector's item because of its supposed rarity and because it had remained virtually unchanged from prehistoric time, possibly living in the Miocene age, about 28 million years ago.

OSC entomologists became more interested in them 2 years ago when beetles were found attacking Newtown apples in many Hood River orchards. Further checking revealed the killing ability of the different species, plus some further information on the rain beetle's living habits.

This fall, Ellertson is testing possible controls based on his life cycle studies.



GOUGED ROOTS show one difference between rain beetles found at Hood River and at The Dalles. Deeply chewed root at bottom came from The Dalles area, top root came from Hood River area.



If you are an Oregon resident, you can receive OREGON'S AGRICULTURAL PROGRESS free. Ask your County Extension Agent or write to the Bulletin Clerk, Commerce Hall 1, Oregon State College, Corvallis, Oregon.

Penalty for private use to avoid payment of postage \$300 • Agricultural Experiment Station • Oregon State College, Corvallis, Oregon.

J. E. Price, Director • Permit 1115 • POSTMASTER: Please return free if unclaimed. See Postal Laws and Regulations.

FARM OUTLOOK

(Continued from page 3)

Keep your receipts for wool, lambs, and sheep sold in 1955. Receipts will be needed to determine your incentive payment—the better the sale, the better the bonus. This makes it doubly important that you sell your wool for the best price possible. Your county ASC office will handle details of the incentive payments.

Poultry

The 1954 "bust" in egg prices is almost certain to be followed by favorable prices next fall. Many folks who were anxious to get into the chicken business a year ago will be staying out next year. If you have a good poultry setup and have good luck with chickens or turkeys, try to stay in the business in '55. Both turkey and egg marketings are likely to be smaller next fall.

Remember, early chicks pay best. They should be laying large eggs when prices are highest.

Dairy

Dairy product prices and cost in 1955 probably will see little change from 1954. The butter, cheese, and dried milk surplus in government hands will keep milk prices under pressure most of the time. Supports probably will be changed very little.

Even so, the nation may be starting to lift the dairy surplus problem that has depressed prices. The national production rise has slowed, sales have increased, and government purchases are lagging behind last year. Yet, there

is little chance for price improvement in 1955.

In Oregon, repeal of milk control legislation in the November election adds another uncertainty to the dairy picture, locally at least. Probably little of the November and December decline in producer prices can be recovered in the year ahead.

Grains

Wheat. The lower support price on the '55 wheat crop is almost certain to bring the first significant drop in Oregon wheat prices in several years. Acreage is being restricted, but stocks probably will be larger than ever when the new harvest starts. Only extreme drought or all-out war could pull prices next fall up to levels of recent months.

This looks like the start of a long downhill slide in wheat prices. Carried far enough, substantial amounts of wheat would be priced into the nation's big feed grain market. In time, this would bring relief from planting restrictions and could halt the income dive.

Wheat incomes have been too good to last and some decline seems almost inevitable. Farmers, businessmen, public officials, and others need to recognize this fact and to plan for it in years ahead. A sharp drop in wheat income could break the backbone of business in many Northwest communities.

Oats and barley plantings will increase again in '55. Increases will not be as large as the 1954 hikes, but they

will be large enough to keep the storage problem close at hand. Lacking Liberty ships, the storage threat of 1954 may become real in 1955. You have until January 31 to take out government loans on any barley or oats you haven't sold by that time.

Potatoes

Fairly favorable prices for the 1954 potato crop may tempt farmers to raise too many in '55. Lower prices are very likely for the midseason crop. Current signs are that California will plant a big acreage of early potatoes. Low prices for these would hurt summer and fall marketings from Malheur County.

Late Russet prices stand a better chance of holding up. But don't plow up good alfalfa or clover fields for potatoes in 1955, at least not yet. Study information on planting intentions in other states and watch for later outlook reports before making final decisions. The same is true for onions. They may be headed for trouble next year, especially if prices of onions now in storage improve as much as expected.

Fruits

Fruit will have ups and downs as usual in the year ahead. Weather here in the Northwest and elsewhere in the nation will hold the key to price and income. With consumer spending expected to hold about steady, changes in national production and in processors' carryover will determine price trends.