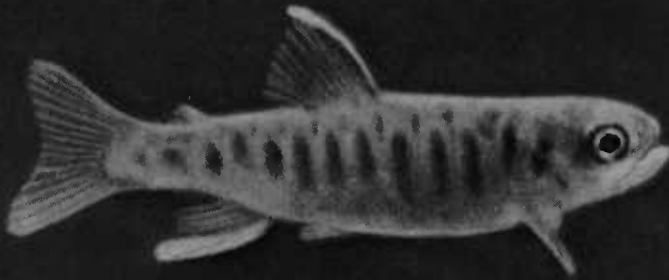


# Oregon's Agricultural **PROGRESS**

**"Boss" Salmon  
Asserts His  
Authority**



**Rolled vs. Pelleted Barley for Fattening Weaner Steers**

**Planting Barley Early May Mean Higher Yields**

**OREGON STATE COLLEGE**

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**CORVALLIS**

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**WINTER 1961**

# Oregon's Agricultural PROGRESS

Vol. 8

No. 1

Published by the Agricultural Experiment Station, Oregon State College, Corvallis, F. E. Price, Director; R. G. Mason, Editor; Alice F. Dalbey, Assistant Editor.

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**COVER:** Fingerling silver salmon are limited in food and living space in coastal streams. Result: a few aggressive fish dominate a pool. Upper fish in this composite photo is threatening a submissive fish. These aggressive salmon enjoy better growth and survival. Story, page 7.

**F**ARMERS COULD gain more than they lose if efforts to check the current recession are reasonably successful.

Much of the current slowdown in economic growth and the letdown in employment stems from a new abundance of industrial goods coming mostly from factories in this country, but to some extent from factories overseas. This abundance of factory goods has reversed the uptrend in prices of most machines, chemicals, building materials, and other manufactured items used in ever-increasing amounts by efficient farmers.

Industrial managers are having much difficulty "administering" prices under present supply conditions. This puts

## Dear Reader:

This issue begins the 8th year of bringing you research results from your Agricultural Experiment Station as well as up-to-date outlook information.

You will soon receive a "return" card asking you to let us know if you wish to continue receiving *Oregon's Agricultural Progress*. As in the past, the magazine will be mailed free to Oregon residents on request.

farmers and other buyers in a much better bargaining position. In short, these conditions are doing much to check the rise in prices paid by farmers that has prevailed most of the time for the past quarter of a century. It could relieve some of the pressure from the cost side of the price-cost squeeze.

It is true that attempts to maintain factory-product prices include production cutbacks and layoffs. But, the resulting unemployment and loss of salaries and wages is not felt as quickly in the food markets now as it was in the days prior to unemployment compensation, social security, direct assistance, pensions and other supplementing sources of income. Thus we see food sales continuing to hold up in the current economic slowdown as they did during most of the 1958 recession.

Of course, if the recession is not checked by the third quarter of the year, its effects would likely be felt in the markets for foods and farm products. There would be renewed downward pressure on the prices-received

Slaughter cattle prices should hold throughout winter . . . lamb prices not likely above last year's . . . less grain and hay than a year ago.

# Farm Outlook

By Agricultural Economist M. D. Thomas

side of the farm price-cost squeeze, even though supplies of farm products did not increase.

Here in Oregon we started the year with fewer people on strike, a few less employed and considerably more unemployed than a year earlier. The employment picture is about the same nationally. As expressed by state and national leaders: "This gives cause for concern but not for panic."

While the current situation can bring some temporary relief to people in farming, it also temporarily adds to the difficulties of those trying to find income and investment opportunities off-farm. But it is not likely to re-

verse the longtime trend toward fewer jobs on farms and more jobs off-farm.

Out on the dynamic farm front there are many changes underway that will affect farm markets in the months ahead. These will be influenced somewhat, but probably not greatly changed in the near future, by actions in Washington, D. C.

Almost sure to come in 1961 are increases in beef, hog, poultry, and potato production. At least these would be the normal responses to economic conditions prevailing during the past year or so. And the usual consequence would be lower prices. It still seems safest to count on usual, rather than

unusual, consequences when making production and marketing decisions.

## Beef cattle

Slaughter cattle prices probably have already experienced most of the boost coming from the reduction in pork supplies. But, prices should hold up quite well through the winter and early spring even though numbers in the nation's feedlots as 1961 started were 6% larger than a year earlier.

Later a further increase in supplies coming from pastures and ranges, plus an upturn in national pork production, probably will yield prices near last September's lows.

Cattle markets through 1961 will be bolstered to some extent by new evidence coming from the 1959 census, indicating that cattle numbers are smaller than previously estimated.

## Hogs

Probably the highest hog prices in 1961 are close at hand, if not past, but the seasonal drop this spring should be rather mild.

A new buildup in hog numbers started last fall. It is likely to continue in 1961 and 1962 nationally. It should continue longer in Oregon if we are to make the most of our opportunity to supply more of the pork wanted by Pacific Coast meat-eaters.

This spring's pig crop, nationally, is expected to be 5% larger than last spring's small one. This increase promises moderately more pork going to market in the last half of 1961 than in the last half of 1960—not enough more to depress hog prices seriously,

*(Continued on page 16)*

**STRAWBERRIES** are in a favorable market position. Cold storage holdings are below a year ago, movement has been faster, and prospective acreages

for harvest differs little from last year. Heavy movement of frozen berries could boost processor's bids on new crop above those of the past 3 years.





FOR STEERS on the wintering and fattening ration, barley was fed with peavine silage and pelleted alfalfa hay. A "sliding scale" was used in which daily grain fed was a percentage of body weight. Pelleted vs. rolled barley was only comparison made during the 236-day feeding experiment.

# Rolled vs. Pelleted Barley

Tests with 72 weaner steers at the Milton experimental feedlot indicate rolled barley puts on cheaper and faster gains primarily during a certain portion of the total experimental feeding period.

EXPERIMENTS are under way at Corvallis (below) as well as at Milton and Ontario to test full feeding of barley plus a protein supplement as complete ration. Rolled and ground grain are being tested.



**R**OLLED OR PELLETED barley—which will fatten weaner steers cheapest and fastest?

It depends upon when rolled or pelleted barley is fed, according to research results reported by OSC Animal Husbandman D. C. England and Umatilla County Extension Agent Norton Taylor.

Research at Milton experimental feedlots indicate rolled barley puts on cheaper and faster gains in the latter 60-66 days of feeding. Up till then, there was little difference between grain forms—rolled or pelleted.

This result was the same for two experiments. For one, form of barley was tested in a wintering and fattening ration with weaner steers; for the



other, as a finishing ration with weaners.

For weaner steers, on the wintering and fattening ration, grain was fed with peavine silage and pelleted alfalfa hay. During the first 56 days, daily grain amount was one-half of 1% of average body weight. During the next 56 days, it was 1%; the next 56 days, 1½%; and thereafter to market, 2%.

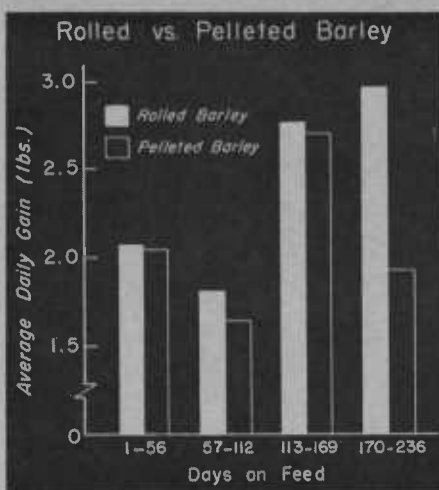
Peavine silage was fed 10 pounds per head per day during the first 56 days, and reduced each 56-day period to a minimum of about 5 pounds per head daily. Pelleted alfalfa hay was full fed after the grain and peavine silage was eaten. Only difference between the two groups was the form of grain: rolled vs. pelleted barley.

Results are in the table. The advantage of rolled barley during the latter part of the trial is evident in the graph.

Note in both the table and graph that gains were almost the same for steers fed either rolled or pelleted barley in the early days of the trial. But during the last 66 days, those fed rolled barley put on faster and cheaper gains than those fed pelleted barley.

England points out that it was necessary to restrict roughage to obtain a daily grain intake of 2% of body weight. This restriction was more severe for pellet-fed than for rolled-fed lots.

The researchers also report that during the feeding trial, steers fed rolled



barley required 402 pounds of grain, 409 pounds alfalfa pellets, and 385 pounds peavine silage per hundred pounds of gain. Pellet-fed animals required 431 pounds grain, 421 pounds alfalfa pellets, and 403 pounds of peavine silage per hundred pounds of gain.

During the last 66 days, however, animals fed rolled barley showed even greater advantage. For every 100 pounds of gain, they required 622 pounds of barley, 218 pounds alfalfa pellets, and 255 pounds of peavine silage. Those fed pelleted barley required 799 pounds of grain, 183 pounds of alfalfa pellets, and 254 pounds of peavine silage for each 100 pounds of gain.

England and Taylor also compared

rolled vs. pelleted barley in the last 61 days of fattening weaner steers. Again, rolled barley was superior.

In this experiment, cattle had been fed a pelleted ration to paired lots from January to August. Then, the researchers switched the *slower* gaining lots from pellets to rolled barley. Otherwise the ration was the same for each group.

#### Rolled barley superior

It took about a month to make the switch. Up to the start of the switch, August 1, average daily gain for the pelleted lots was 1.88 pounds per day; for the lots to go on rolled grain, 1.80 pounds. Remember that England and Taylor purposely put the *slower* gaining lots on rolled barley as an acid test of the advantage of rolled over pelleted grain. By the time the switch was completed, August 29, cattle fed rolled grain averaged 2.61 pounds per day, pelleted-fed animals averaged 2.59 pounds. At the end of the feeding period—61 days later—rolled barley-fed cattle gained 2.43 pounds daily compared to 2.23 pounds for those remaining on pelleted grain.

England emphasizes that these experiments were started before full-feeding of rolled barley plus a protein supplement as the complete ration was suggested. Experiments are now under way at Milton-Freewater, the Malheur Branch Station, Ontario, and at Corvallis, comparing this feeding approach to one using a standard roughage.

### Compare Rolled, Pelleted Barley for Fattening Weaner Steers

Time & Ration	No. Animals	Ave. Daily Gain	Ave. Daily Grain Intake	Ave. Daily Alfalfa Pellet Intake	Ave. Daily Peavine Silage Intake	Feed Cost Per Lb. Gain
		Lbs.	Lbs.	Lbs.	Lbs.	
1-56 Days						
Rolled Barley .....	36	2.06	2.7	12.4	10.0	\$0.19
Pelleted Barley .....	36	2.04	2.8	12.3	10.0	0.19
57-112 Days						
Rolled Barley .....	36	1.81	6.0	10.7	10.4	0.23
Pelleted Barley .....	36	1.64	5.9	10.2	10.0	0.25
113-169 Days						
Rolled Barley .....	36	2.75	11.1	9.7	9.2	0.20
Pelleted Barley .....	36	2.69	10.9	9.4	9.3	0.20
170-236 Days						
Rolled Barley .....	36	2.95	17.4	6.0	7.2	0.20
Pelleted Barley .....	36	1.92	16.2	4.3	5.0	0.25
Total (1-236 Days)						
Rolled Barley .....	36	2.36	9.5	9.5	9.1	0.20
Pelleted Barley .....	36	2.07	9.2	8.8	8.4	0.22



**ANIMAL** Husbandman C. W. Fox weighs lamb fed high estrogen meal. Wethers on high estrogen gain faster than those on low estrogen ration.

Forages with high and low estrogen content are being fed to ewes and wethers at OSC. Results may lead to development of one type feed for breeding animals, another type for feeder stock.

## Coming - - - One Feed for One Need

**T**HE DAY may come when farmers will feed breeding animals one type of forage and feeders another type.

Recent research to find estrogen content of various legumes and effects of this estrogen on animals has opened up a wide area of work for plant and animal scientists.

Results of this research could mean more efficient breeding animals, better tasting meat, and probably, more efficient use of forage products.

Estrogens—substances responsible for all this activity—promote development of female characteristics including ovulation. When taken in quantity, estrogens may hinder an animal's ability to reproduce. On the other hand, they may be beneficial in stimulating growth.

Within the past several years scientists have discovered that certain plants have more estrogen content than others. OSC researchers reported in 1959 that ewes fed on red clover—frequently a high estrogen plant—often had difficulty reproducing.

OSC Animal Husbandmen J. E. Oldfield and C. W. Fox have just completed a feeding study comparing dehydrated alfalfa meals which have high and low estrogen contents.

A meal known to be high in estrogen was made into a  $\frac{1}{4}$ -inch pellet which included 25% ground barley and 10% cane molasses.

(Various forages are being analyzed for estrogen content at the U. S. Department of Agriculture's western utilization research laboratory at Albany, California. Scientists at Albany supply Oldfield and Fox with forages found to be exceptionally high or low in estrogen.)

### **Low estrogen pellet fed**

Another meal, known to be unusually low in estrogen, was made into an identical pellet. The rations were fed to two groups of growing lambs, including equal numbers of ewes and wethers.

Results show that . . .

¶ Wether lambs on the high estrogen ration gained faster than those on the low estrogen compound.

¶ Ewe lambs on high estrogen gained more slowly than lambs on the other pellet.

¶ Lambs on the high estrogen ration showed pronounced increase in udder and vulval development.

¶ Rations seemed to have little effect on final carcass grades.

¶ Meat from lambs fed the high

estrogen ration came out ahead on tasting tests. A panel of experts rated then tops in tenderness, juiciness, and texture.

This research suggests that it may be possible to pick out certain legumes which have high estrogen, breed for increasingly high estrogen content, and eventually have a plant that may be—for rate of gain—just what a feeder needs.

Conversely, since the estrogens appear to be bad for reproductive functions in female animals, plant breeders may select plants with low estrogen content and develop a forage designed especially for breeding animals.

Oldfield and Fox have already begun their next estrogen experiment—and this time they are working with meals which contain an even wider spread of estrogen.

This new research is designed to check out results of the first test and also to discover whether implanting estrogen compounds—stilbesterol, in this case—will make rate of gain even faster when done in conjunction with feeding a high estrogen compound.

All this research is in the formative stage, but, with cooperation of the plant breeders, happier days are ahead for breeders, feeders, and consumers.

# Predicting a Watershed's Future

An intensive study of the life of a watershed is underway in the Alsea River area. Scientists from OSC and many other state and federal agencies are co-operating to predict how we can best use our limited natural resources.

**E**VER WONDER what your favorite hunting or fishing area will be like 20 years from now?

Oregon State College is cooperating with many state and federal agencies in a pioneering study of the whole life—past and future—of a watershed. Original tax dollars were matched by nearly twice as many research dollars from a dozen federal and state agencies as well as from several corporations and individuals. And scientists from various disciplines are focusing all their skills and training on the problems of a single typical river basin—the Alsea. All the things that can affect management and use of a watershed will be examined.

Results of this research will, in the long run, help us learn how to develop our watersheds for best domestic, industrial, agricultural, and recreational use—while at the same time we keep our rivers healthy for fish.

The Alsea rises on the wooded slopes of Mary's Peak and drains nearly 290,000 acres of Benton, Lincoln, and Lane counties before it empties into the Pacific at Waldport.

For the past several years scientists have been crawling on hands and knees through thickets of vine maple and salmonberry and wading hip-deep in swollen creeks to set up instruments and take samples which will give a complete picture of the potentials of the Alsea watershed.

So far, they have . . .

¶ Mapped, with detailed aerial pho-

tos, 212,000 of the 290,000 acres. The entire watershed will be mapped by July 1961.

¶ Identified and mapped 21 types of soils, and completed lab analyses of 17 of them. Thorough knowledge of soil types will help find best areas for logging, farming, reforestation, and recreation.

¶ Studied undergrowth to decide how and where to reforest for best production.

¶ Installed stream gauges to keep track of the flow and temperature of the Alsea and its tributaries.

¶ Checked and analyzed samples of

water to learn about seasonal changes in water quality.

¶ Set up three tributaries to study effects of logging and to learn whether staggered or clear cutting is least destructive of fish and other stream life and has least influence on quantity and quality of water.

¶ Learned that nine out of ten salmon produced in one small creek died of natural causes before they reached the Pacific.

¶ Learned that silver salmon have a social order, and that older residents in a stream give newcomers rough competition for food.

**ROBERT PHILLIPS and Larry Heckart, of the Oregon State Game Commission, take tests to find velocity of ground water flowing through gravel on Deer Creek. Rate of flow affects fish egg survival.**





All these results didn't just happen.

OSC Biologist Don Chapman, coordinator of the Alsea Basin study, points out that the research falls into certain well-defined categories.

Since the major influence in the area is water—annual rainfall is about 90 inches—a survey of the water resources is a basic objective of the research team.

The scientists need to know exactly where rain falls and what quantities reach the stream. They also are concerned with quality of the water—what happens to it after it falls.

Water loaded with sediment damages fish eggs—and probably cuts down on fish production. Patterns and methods of logging affect amount of sediment washed into a creek.

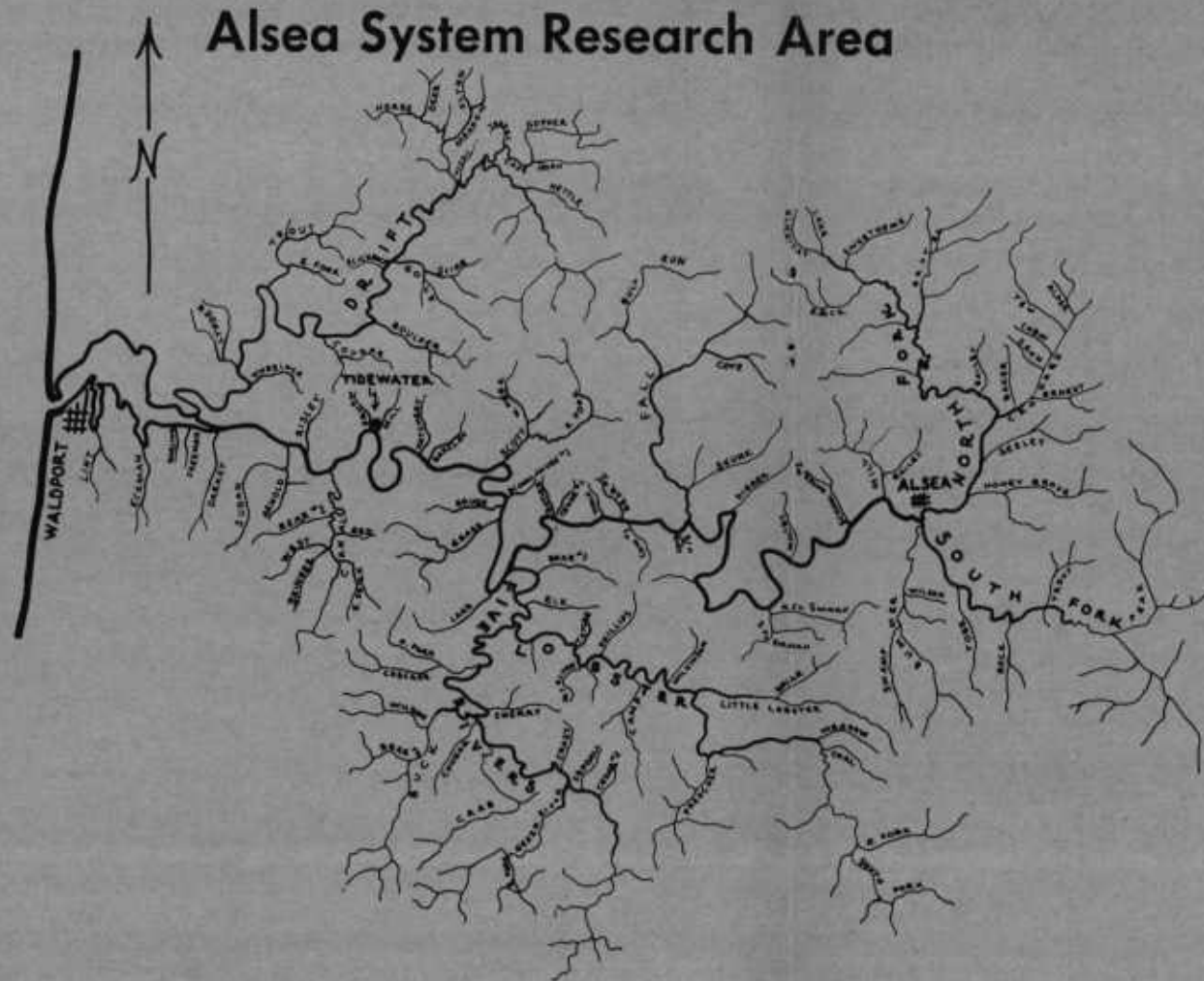
Water that is pure when it falls may become polluted and contaminated—for humans and animals—as it flows downstream and collects sewage and industrial wastes.

Water temperature probably has great significance for production of fish, Chapman emphasizes, and quantity of flow, in different areas of streams and creeks, also may affect both fish production and land usage.

Soil and what grows on it is the next concern of the researchers. While soil types are basic to the understanding of an area, trees, weeds, bushes, and all forms of vegetation from the

PACIFIC OCEAN

## Alsea System Research Area



DONALD CHAPMAN, OSC coordinator of the Alsea watershed study, investigates fish trap built across Deer Creek. Nearly 88% of the small fish com-

ing out of spawning beds on this creek died of natural causes in 1959. This high rate may be normal, but study is needed to pin-point actual causes.



gan with highly detailed aerial photos. These were combined with ground level reconnaissance and detailed surveys. Final result is an accurate map of soils and vegetation of most of the Basin.

Preparation for a soil-vegetation survey is time-consuming and deliberate—one scientist spent close to five months preparing for part of the ground level survey on the Alsea Basin.

Analysis of one small segment of information collected in this soil-vegetation study shows that in a particular area...

¶ All soils but those on a south slope should offer a fair location of young tree growth.

¶ Young trees probably will have strong competition from shrubs and ferns.

¶ Because of the competition, artificial planting probably would be necessary to fully stock a stand of timber on south slopes.

¶ Road construction—for foresters, hunters, tourists—should offer no serious construction problems because of the smooth slope, moderate soil thickness, and lack of slumps and slides.

While all this information is useful to lumbermen, it is of vital importance

SCIENTIST takes water sample to show how much sediment is flowing through the creek.



STREAM gauge helps scientists determine exactly where rain falls and what quantities reach Alsea stream beds. Water is major influence in the research area since the annual rainfall is nearly 90 inches.



soil give a clue to the best ultimate usage of the land.

A soil-vegetation study is a relatively new concept to science, and OSC Soil Scientist John Corliss, leader of this phase of the study, believes that the Alsea Basin work may provide a pattern for surveys in Oregon and other western states.

The idea behind a soil-vegetation survey is simple. When certain soil types, forms of vegetation, and climatic conditions are found in combination, scientists believe these same combinations will tend to recur.

When a scientist—perhaps in another state or country—finds these same conditions, he will know what to expect from the area. Experience and knowledge collected in the Alsea Basin, for instance, could be transferred to other regions with similar conditions.

The Alsea soil-vegetation survey be-



to land managers. Other states, where water shortage is a serious problem, have developed soil-vegetation surveys to use as guides to long-range planning for use of certain watersheds.

Experiments in other areas, plus this work on the Alsea Basin, show that a combined soil-vegetation survey is more useful to long-range planners than separate studies of soil and/or vegetation.

As part of this entire study, Chapman and his associates are doing a thorough-going study of effects of logging on fish and aquatic life found in and around the Alsea. Results will help scientists, foresters, and industrial and domestic users better understand relationships between animal life and environment.

Researchers are studying three small creeks—which eventually flow into the Alsea—to learn about stream life before, during, and after logging.

Stream flow, water temperature, rainfall, suspended sediment, water chemistry, number and kind of fish moving up and down the stream are just a few of the things being studied on a long range basis.

Flynn Creek drainage—which has never been logged, is presently undisturbed and as nature produced it—will be kept as is and used as a comparison, or control.

Needle Branch area will be clear-cut of all timber.

Deer Creek drainage will be logged with a staggered setting pattern—this means cutting in small blocks.

Information about the three creeks will be compared—and scientists and timbermen will know which type of cutting is most advantageous for continued fish life, continued timber production, water quality, recreation, and the many other potential uses of a watershed.

Scientists studying fish life in the Alsea Basin discovered some surprising facts.

Nearly 88% of the small fish coming out of Deer Creek spawning beds died of natural causes during 1959. Chapman says this high mortality rate seems to be the normal situation, but that additional years of study will show whether or not it really is normal.

Scientists also learned that silver salmon are social—but not sociable—creatures. They are snobbish, dominating, and aggressive toward each other and certain fish will control an entire pool.

#### **"Boss" fish gets the food**

The "boss" fish literally raises his fins, opens his jaws, and nips at intruders into his area. Chapman points out that this aggressive behavior may be a device to assure food supply.

Most of the completed research in the Alsea Basin points to one fact.

Logging, agriculture, conservation, recreation, and almost any other use man may make of a watershed are apt to be in conflict with each other all down the line.

The job of the scientists working on the study is to find facts which will

help land managers decide the best line of compromise for all phases of the problem.

For instance, heavy, continuous, logging and road building almost certainly are bad for other uses of the stream—yet, to provide jobs and homes for our people, the trees must be cut. So the scientists are working to learn what type of logging will give fish and wildlife the best break.

In the long run, the Alsea Basin research will . . .

¶ Find out just what effect man's essential tampering with nature has on fish, wildlife, quantity and quality of water, in a certain watershed.

¶ Learn how to evaluate advantages and disadvantages of current practices.

¶ Learn whether there are ways we can better use the land and water on the Alsea Basin.

¶ Help the average Oregonian understand, by demonstration, just what his natural resources can mean to him and to his children—and to teach wise and judicious use of his beautiful country and its natural assets.

Oregon, like most other states, is growing in population. Since 1950 our population has increased nearly 16%. Lincoln County grew 14% in this time, and Benton County increased 23%.

Oregon needs her natural resources—and needs to know how to use them for the best advantage of all her citizens.

The Alsea Basin study is a step in the right direction . . . but many steps remain to be taken.



PART of Alsea Basin study involves a detailed study of three small creeks to learn about stream life before, during, and after logging. Picture on left

shows unlogged area of Deer Creek, on right is logged area on nearby stream. Part of Deer Creek drainage will later be logged in small blocks.

Ordinary houseflies are helping OSC scientists probe the secrets behind insect resistance to sprays.

## Finding Secrets Of Insect Resistance



HOUSEFLY on hypodermic syringe is injected with tiny amount of radio-active material. Method permits study of insect resistance.

**T**HE SECRETS of insect resistance to sprays and poisons are gradually being revealed by OSC scientists.

Just about the time science develops a really good control for a particular insect, the insect develops a resistance to the chemical. DDT was the answer to many prayers—till, after a few years, certain insects became resistant to it.

Key to this resistance is tied up with how an insect's body processes a chemical.

Biochemist L. C. Terriere, working with common houseflies and naphthalene—the mothball chemical—is hot on the trail of the secrets of resistance.

Terriere points out that scientists have suspected for some time that insects contain defense mechanisms which automatically change poisonous substance to harmless materials which can be excreted.

But the scientists don't know much about the nature of these mechanisms. Man has about a dozen of them, and evidence shows that those in the insect may be the same or similar.

OSC researchers are attempting to identify these insect mechanisms with radioactive naphthalene. Terriere says naphthalene was chosen because it can be made radioactive rather cheaply and because something is already known about what happens to it in rats and rabbits.

When a common housefly—chosen because a vital part of this research

involves developing generation after generation as quickly as possible—is injected with radioactive naphthalene, the scientists can “follow” the chemical around inside or outside the insect.

A key man in the biochemical studies being carried on in OSC's Entomology Department is Chemist Richard Boose. He has perfected the difficult technique of injecting tiny amounts of radioactive materials into the fly with a hypodermic syringe—without killing his patients.

With this method the scientists have learned what happens to naphtha-

lene in houseflies, blowflies, onion maggots, and certain grasshoppers.

Flies dosed with naphthalene excrete the toxicant in nine or more different forms. All this happens quickly—within three or four hours after the naphthalene is injected.

A study of the mechanisms involved in changing naphthalene and making it harmless to the fly will help scientists discover which mechanism is strongest against naphthalene specifically.

### Find mechanisms

From this point, researchers can go on and single out mechanisms which are strongest against specific toxicants.

Early experiments show that ground-up tissue from freshly killed flies can detoxify naphthalene in a test tube—so the defense mechanism must be effective even when it has been removed from the fly. This is the first step toward isolating the insect's separate defense.

Terriere emphasizes that all this research is aimed at developing insecticides to which insects cannot become resistant. A thorough understanding of how defense mechanisms function will help scientists develop chemicals against which insects are defenseless.

This is long-range research of the “pure” variety. While the results may not help you next year, or even in five years, they make life easier for us all several decades from now.



HOUSEFLIES used in this research have developed resistance to most available insecticides.

# Plant Early For Higher Barley Yields

FARMERS who plant early this year may have a better chance for a successful harvest. Early planting on college farm produced better yields, higher test weights, and lower percentages of thin kernels.



Planting early is a good risk for Valley barley growers. New OSC research shows that higher yields, bigger increases from fertilizer, and better grain quality resulted when barley was seeded early.

WILLAMETTE VALLEY barley growers who planted early last spring lost nothing and gained much.

Recent experiments conducted by OSC Scientists Tom Jackson and Wilson Foote show that yields were larger, increases from fertilizer greater, and quality of grain was better on early planted barley.

In spring of 1960 researchers planted several sites, on different types of soil, on different dates. Objectives were to study effects of fertilizer and date of planting on yield and quality of malting barley.

Results showed . . .

¶ Planting early brought better yields, in higher test weights and in lower percentages of thin kernels.

¶ Yields were greater and increase in yield from application of nitrogen fertilizer was also greater on the plot which was planted first.

¶ Nitrogen alone and nitrogen combined with phosphorus increased yields on the OSC Hyslop Farm (Willamette Soil). Rates of 80 pounds of nitrogen per acre and of 60 pounds phosphate ( $P_2O_5$ ) per acre produced best responses.

¶ Increasing rates of nitrogen application resulted in lower test weights and higher percentages of thin kernels. (Grain planted earliest and receiving 80 pounds nitrogen per acre had higher test weights and a smaller percentage of thin kernels than grain planted later without nitrogen.)



## Planting Barley Early May Mean Higher Yields and Test Weight

Fertilizer treatments	Yield			Test wt.			Thin kernels (thru 5½ x 64 screen)		
	Planting dates			Planting dates			Planting dates		
	4/1	4/30	5/10	4/1	4/30	5/10	4/1	4/30	5/10
	lb./A.	lb./A.	lb./A.	lb./bu.	lb./bu.	lb./bu.	%	%	%
S (check) .....	1600	1480	930	54.3	52.2	51.4	2	3	5
N <sub>1</sub> S .....	2770	1960	1140	53.4	50.8	51.2	2	8	6
N <sub>1</sub> P <sub>2</sub> S .....	2840	2330	1570	53.9	51.2	50.0	2	7	8
N <sub>2</sub> S .....	3170	2120	1130	52.7	50.5	50.5	4	11	6
N <sub>2</sub> P <sub>2</sub> S .....	3290	2310	1620	52.7	49.9	50.6	5	9	7

This location (Willamette soil) had high phosphorus soil test values. Barley was preceded by rye and alta fescue for seed.

S = 30 lbs. Sulfur/A as gypsum.

N<sub>1</sub> = 40 lbs. Nitrogen/A.

N<sub>2</sub> = 80 lbs. Nitrogen/A.

P<sub>2</sub> = 60 lbs. Phosphate (P<sub>2</sub>O<sub>5</sub>)/A banded at planting time.

Application of phosphorus did not influence test weights or percent thins.

¶ Seedlings at the five leaf stage contained more phosphorus when the fertilizer was banded than when it was broadcast—but only in the plots seeded early.

¶ Sulfur and potassium applications did not cause any important changes in yield.

The scientists point out that these experiments may have significance for growers troubled with yellow dwarf virus. Early research at OSC shows that grain which can reach the 4-5 leaf stage before being attacked by the virus can probably produce a near-normal crop.

So if fertilizer applications, such as those tried in this experiment, can force early planted barley to a reasonable growth, yellow dwarf damage may be slight.

### Reach 5-leaf stage early

Work completed this past season shows that early spring planting, accompanied by heavier-than-usual fertilizer applications, may help a good share of a Hanchen barley crop reach the 5-leaf stage before the virus-carrying aphids will normally move into grain fields.

Just because this past season was a good one for growers and a bad one for virus is no reason to believe that next season will be the same.

No one knows, now, what our spring weather will bring, and the scientists suggest that if it does turn out to be

a bad virus year, farmers who plant early will have a better chance for a successful harvest.

While all the results in these experiments were encouraging and meaningful, researchers point out that they might have been different if temperature and rainfall distribution had been significantly different.

Jackson reminds growers that early planting will be successful only on well-drained soils.

Also, more weed control than normal may be necessary with early planting. Earlier OSC work indicates that malting barley is tolerant to 2,4-D anytime after plants are 6 inches tall. Spraying should be done as soon as possible after plants reach this height, and the chemical will do no damage to yield or malting quality if applied at recommended rates.

Jackson also believes that if phosphorus is lacking in soil, slightly more than usual might be added. He points out that soils are colder and wetter in early spring, and banding phosphorus at planting time will probably produce best results.

All this research is just one phase of a concentrated effort to find a way to avoid the problem of yellow dwarf virus.

Final and best answer will probably come when Agronomist Wilson Foote and his colleagues develop grain varieties resistant to the disease. Eight or ten barley varieties out of several thousand appear to have this resistance and these are being used as parents for new virus-resistant barleys. Research to develop a completely resistant variety is demanding and may take five years or more.

**BARLEY** on left was planted early last year. Early planting will be successful only on well-drained soils. Also, more weed control than normal may be necessary for grower who decides to plant early.



# Research Briefs

Three Promising Hop Selections Due Testing

Turkeys Can Be Kept in Production the Year 'Round

## Inexpensive Control Found for Cheatgrass in Wheat

EFFECTIVE and inexpensive control of cheatgrass is now possible with new chemicals tested at OSC.

That's the report of Agronomist William Furtick.

Atrazine and Amitrole were combined during 1959 experiments conducted by Furtick, Agronomist Dean Swan of the Pendleton Branch Experiment Station, and OSC Agronomist Frank Phipps.

A combination of 2 to 4 pounds of commercial 80% active Atrazine per acre and 2 pounds of 50% commercial Amitrole gave complete kill of cheatgrass, Russian thistle, other weeds as well as volunteer rye along fence lines and roadways of eastern Oregon.

Furtick points out that the chemicals were applied after germination of weeds in late fall or during winter or early spring. This provides excellent protection against weed seeds which would otherwise invade financially valuable crops.

Best news about these new chemicals is their cost—a maximum of \$20 per acre for control. Furtick says this means that a farmer can kill the weeds

in his fence line for \$10 to \$20 per mile of fence—depending on how wide an area he has to spray.

### Cheatgrass controlled

Development of these new, economical chemicals will help rid wheat and barley growers of that expensive nuisance—cheatgrass. This weed has reduced grain yields by 20% or more in badly infested fields, according to Furtick, and has also competed with grain crops for available moisture and fertilizer.

While volunteer rye has not been as serious an economic menace as cheatgrass, it has invaded grain fields so heavily that, in some areas, acceptable quality grain cannot be produced.

Chemical control of cheatgrass and rye will also protect the grower from the roadside fire hazard which the early maturing weeds create. Furtick points out that cheatgrass makes a dense mat of dried vegetation before grain is ripe. By harvest time, this dry grass is extremely combustible and occasionally causes serious fires in the Columbia Basin grain areas.

Agronomists Phipps and Swan will continue their work with weed controls to determine which of the various possible chemical combinations will give the best control of cheatgrass and rye for the dollar spent. While the combination of Atrazine and Amitrole gives exactly the weed control needed, the scientists believe there is always the chance that other combinations might give equally good control for an even more nominal cost.

All this research has two objectives—to clean up roadways and protect clean fields, and to kill out weeds which have already infested crops.

## New Hop Selections Due Full Scale Tests

THREE PROMISING new hop lines are in final stages of testing, according to USDA Agronomist S. N. Brooks.

128I is high in both alpha acid and oil content. It is a seedless hop which is productive but susceptible to downy mildew. High alpha acids account for the bittering or flavoring of hops. Some brewers, however, prefer hops with low alpha acid content, while others prefer hops high in alpha acid.

135I is fairly productive, has a mild quality, is low in alpha acid and oil, and is exceptionally resistant to mildew.

144I is a medium producer, and while it is only slightly resistant to mildew, Brooks believes it has certain quality characteristics which will make it desirable to industry.

These varieties are being tested in grower trials scattered throughout the Willamette Valley.

If all goes well, these new varieties may be released by winter of 1962.

Principal aim of hop breeders is to develop high quality lines which are highly productive, resistant to mildew, and which don't shatter when harvested mechanically.



CHEATGRASS-infested wheat plot at the Pendleton branch station is at left. Ability of Atrazine and Amitrole to control weeds shown at right. Chemicals were applied after weed seed germination.



OSC Poultry Husbandman J. A. Harper inspects new turkey poults hatched on college farm in January. They will be used in research aimed at making fresh turkey available to consumers all year 'round.

## Year 'Round Turkey Production Possible

HOW ABOUT a fresh roast turkey on July 4th? or Labor Day?

Strange as this may sound, it may be a coming thing.

OSC scientists have developed a method of keeping turkeys in production year 'round—and hence providing mild weather turkey breeders with a year 'round market.

Most "normal" turkeys are on a fairly set breeding cycle—and their maturity date neatly fits the high market demand of the winter holidays. Because of the marketing problems involved, and because many turkey breeders in the country are located in areas where winter hatching is difficult, breeders have not selected for summer production.

For the past three years, OSC Poultry Husbandmen J. A. Harper and J. E. Parker have been working at upsetting the normal breeding cycle.

Experiments just completed show that they have been successful. White turkey hens hatched in November and December produced heavily during August, September, and October.

This high production resulted from a bit of deceit on the part of the researchers.

The hens, maturing during a time of year when the normal day length was increasing, were allowed to have only 9 hours daylight for 4 weeks starting June 1.

After this 4-week stretch of 9 hours daylight, they were subjected to 17 hours of daily light. Hens on this schedule had a higher rate of production than similar hens maintained on a natural day length to June 28 and 17 hours of light every day thereafter.

Parker and Harper theorize that the 4-week rest period—of 9 hours daylight—was necessary to convince the hens that they should go ahead and lay. It was, in effect, a sort of fake winter.

Another part of this research tested effects of injecting turkey hens with hormones. Researchers hoped that various hormone combinations would succeed in depressing laying during a "rest period"—and might stimulate laying when the hormone treatment ended.

Results were negative. As of now, the scientists believe the most effective way of stimulating summer laying is to reduce light. Continued study in effects of various hormone preparations on turkey hens is planned for the future.

All this research means that the homemaker may soon be able to have fresh turkey—as well as chicken—for "off-season" meals, and turkey producers will have a more stable product and can plan a continuous marketing program.

## Old Age May Cause Browning in Carrots

INTERNAL BROWNING of carrots may be an inevitable problem of old age.

That's the latest report from OSC Horticulturist Harry Mack.

From time to time growers are plagued with discoloration of the core of carrots. Research shows that this browning—also called brown heart, brown flecking, and black heart—quite probably is related to planting date and mineral nutrition.

While this disorder may affect as little as 5% of the crop, it requires extra man power on the processing inspection team to sort out discolored pieces—and hence is an economic problem for growers and processors.

Earlier research and survey work by OSC scientists clearly indicated certain relationships. Their work showed . . .

Growers planting earliest tended to have more browning.

Growers with lowest soil potassium levels had more browning.

Growers with lowest soil boron levels had more browning.

### Fertilizer effects tested

To check these results against other possible reasons for browning, Mack and OSC Plant Pathologist, E. V. Vaughan, teamed up with T. L. Jackson, OSC Soils Scientist, to check possible effects of fertilizer practices on a carrot crop. These trials were conducted in the Eugene-Harrisburg area and at Corvallis in 1958-59. Results showed . . .

Yield was increased with application of potassium and high rates of nitrogen-phosphorus in the Eugene-Harrisburg area. No yield measurements were made at Corvallis.

Carrot browning was low in the Eugene-Harrisburg experiments.

Conversely, browning was higher in the Corvallis trial.

Carrots planted earliest and left in the ground longest had the highest percentage of browning.

Mack points out that these results are far from clear-cut. The prime thing which seemed common to all the browned carrots was age. Research to pin down exact causes for browning will continue.



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## Farm Outlook . . .

*(Continued from page 3)*

but enough more to dim chances for prices above last fall's favorable levels, especially since beef supplies are increasing too.

The favorable hog-grain price relationship favors feeding to heavier weights than usual during the first half of the year, at least. Later, as prices move toward lower levels, it will pay to market at lighter weights again.

### Sheep

The upturn in U. S. sheep numbers starting in 1957 may have been checked during the past year. Slaughter in the last half of 1960 was about 10% greater than a year earlier. This helped to hold lamb prices down and discouraged imports.

Slaughter this winter is expected to decline seasonally. By spring, prices may be back close to those of last spring. Chances of prices above last year's levels look slim so long as beef production is increasing.

Wool prices are likely to improve as the year progresses, if the recession shows signs of "bottoming-out" by late spring. A prolonged slump in the economy would likely weaken buyers' confidences and offset any strength growing out of the relatively small stocks of raw wool held by mills.

### Poultry

As usual, higher prices of the past year have generated renewed optimism in the poultry industry. This is already evidenced by larger chick hatches and

by turkey raisers' plans to increase production this year. This most likely will lead to prices in the second half of 1961 below those of recent months.

### Fruits and vegetables

Processors are finding themselves in a rather comfortable statistical position with most fruits and vegetables. Some of last year's packs were small and most are moving well. Carryovers will be comparatively low as time for new packs approaches.

Strawberries are in a quite favorable market position. Cold storage holdings are below a year ago, movement has been faster, and prospective acreages for harvest is little different from last year. Continued heavy movement of frozen berries could boost processors' bids on the new crop above those of the fairly stable level of the past three years.

Stocks of frozen boysenberries and black raspberries are also under last year and holdings of red raspberries and blackberries are only slightly larger.

Among canned fruits, prunes are scarce as a result of last year's short crop. There are fewer cherries and pears in canners' hands too, but more apricots and peaches and as much applesauce as a year ago.

Supplies of fresh apples and pears are smaller and should stay in strong market position during the remainder of the present season.

Smaller stocks of canned peas, corn, and tomatoes are adding firmness to markets for green beans, asparagus, and other canned vegetables.

### Potatoes

Larger potato stocks leave growers and shippers in a weaker bargaining position than a year ago. These larger stocks diminish chances for a strong finish to this shipping season. A weak finish would hurt late sellers but help reduce the strong temptation to overplant this spring. Any increase in acreage seems likely to yield disappointing prices next fall and winter to growers depending on fresh market outlets.

### Grain and hay

There is less grain and hay in Oregon and the Northwest now than a year ago but more, nationally. Grain prices in Oregon would be much higher than they now are if it were not for the larger supplies, especially of wheat, corn, and grain sorghums, in other parts of the country. All told, the nation's stocks of feed grains as 1961 started were a new record high, 8% above a year earlier. Exports of Northwest wheat are expected to continue heavy. Exports have drained Northwest wheat supplies to a fifth below average by January 1 of this year. Barley supplies are also short and Oregon feeders have turned to corn and grain sorghums.

### Seeds

Supplies of most grass and legume seeds remain large for the present season, even though exports have held up well for some items. Imports of bluegrass, the fine fescues, and alsike clover seed continue at substantial levels.