Oregon's Agricultural PROGRESS

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Features: Page

COVER STORY:

How was stubble from this wheat crop handled? Burning was the common method of handling it when this picture was snapped. But researchers at the Pendleton branch station have developed better methods for using stubble to control erosion and maintain yields.

In the Columbia Basin . . .

Stubble Mulch HALT

A RAINDROP strikes the soft, rich earth in the steeply pitched Columbia Basin wheat country. Gathering speed, it joins others, forming thin rivulets. These pick up the loose grains of silt. Encouraged by the steep slope, the rivulets merge into a sheet-like flood, stealing precious topsoil, or eventually gouging terrible gullies.

Suppose some straw from last year's wheat crop was anchored in the surface inch of soil. This would prevent soil compaction from rain and halt the headlong rush of rain down the slope. After striking the straw, water would slowly drain around the lower end, only to hit the next straw. Speed—the erosion-producing property of the rain—would be lessened, possibly halted.

Erosion like this on high-producing wheat land in the Columbia basin can be controlled by stubble mulching wheat straw.

S EROSION

Research at Pendleton and Sherman branch experiment stations has shown that stubble mulching wheat straw will stop both wind and water erosion in the Columbia Basin. Special equipment is needed to handle heavy stubble, and nitrogen applications are necessary to boost yields to profitable levels.

Leaving wheat straw on the soil's surface is known as stubble mulch or trashy summer fallow farming. It's not new. Farmers tried it first as a desperate attempt to halt wind erosion in the dryland wheat areas during the drought years of the '30's.

But in the high producing wheat areas of Umatilla, Union, and Wallowa counties, where water is the main cause of erosion, farmers have been reluctant to adopt it. For one reason, stubble mulch is tough to handle. When 4,000 to 7,000 pounds of straw are produced per acre, most farmers don't have the special equipment needed to handle this straw. Stubble may range from 24 to 36 inches following wheat harvest. The stubble causes plugging, inconvenience, and loss of time.

But large amounts of straw will control erosion better than any other practice farmers can adopt, according to Merrill Oveson, superintendent of the Pendleton Branch Experiment Station.

Special equipment needed

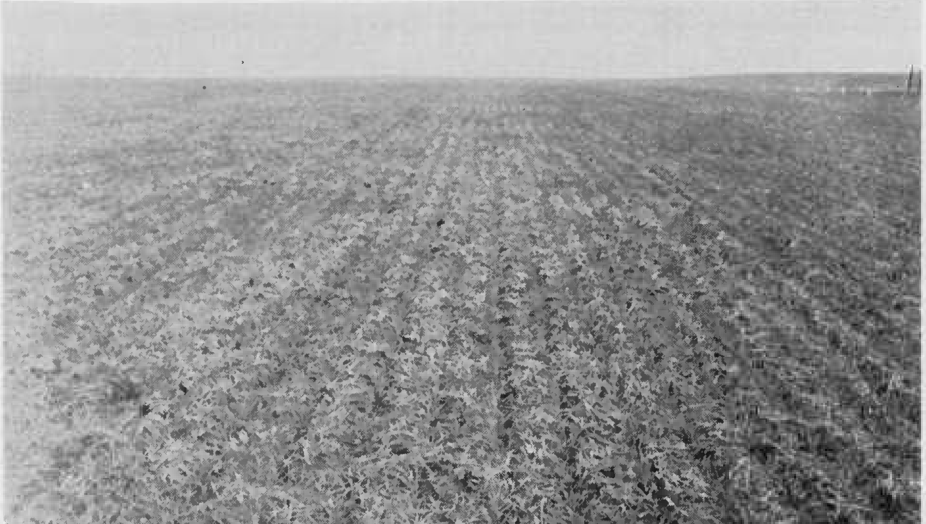
Special equipment is needed to handle stubble, and Oveson and his staff have tested several of the sweep plows in the market for making trashy summer-fallow. These include the Cheney Tillevator, the Calkins Tillevator, and the Noble blade. All three

(Continued on next page)

Three Steps in Stubble Mulching

Heavy stubble is worked with sweep plow at 5 inch depth. This loosens ground for follow-up tillage.

Same stubble after it has been worked twice with a skew treader. Note well scattered straw.



Land seeded to wheat. Straw anchored in surface inch of soil, ready to protect land from erosion.

will go through heavy standing stubble without trouble. If farmers in high-producing wheat areas switch to a stubble mulch system, they'll need equipment of this type, say the researchers.

In the lower-producing wheat areas, any of these sweep plows can be used, but there are many others on the market that will work, too. A number of nationwide implement manufacturers carry equipment to which you can attach different size sweeps for stubble mulching. Oveson also has found that the smaller "attached" sweeps will kill volunteer grain and weeds better, but it's best to go over the land twice, with the second operation at an angle to the first. Then the land is thoroughly worked so you can use a rod weeder.

Need stubble buster

In the higher rainfall areas, Oveson says you'll need a stubble buster or stubble cutter before mulching with sweep equipment. The buster breaks up the straw into smaller pieces and spreads it evenly over the land. Or you can use a sweep plow first, following with a skew treader. The treader is a two-gang rotary hoe that whips the straw first to one side and then back the other way. This "skewing" action is caused by the rear gang being set at a slight angle to the first gang of hoes. The rod weeder does not clear easily after sweep plowing when there are more than 2 tons of straw per acre, Using the skew treader prevents this trouble.

Some farmers have stubble mulched with a disk plow, but experiments show that this type of summer fallow does not give effective erosion control, compared to the sweep plows. The disk mixes straw in the surface soil to the depth the land is worked, thus burying part of the straw and leaving part on the surface.

In lighter wheat-producing areas, the disk will bury much of the straw—straw needed to halt wind erosion. Also, it isn't so effective in controlling water runoff.

In experiments conducted at the Sherman Branch Station in 1940-43, researchers measured yearly water runoff and soil loss on research plots that had been plowed with three tillage implements—the moldboard plow, disk plow, and sweep plow.

Results: losses from stubble mulch with sweep plow—.34 inches of water, .13 of a ton of soil per acre; losses from disk plow—.96 inches of water, 7.8 tons of soil; losses from black fallow with moldboard plow—.78 inches of water, 5.67 tons of soil.

If stubble mulch will prevent water runoff, then you should expect greater soil moisture under stubble mulch than under black fallow. Experiments in 1951-52 revealed the difference was from 2 to 3 inches of available water. 1952 results: stubble mulch, 10.87 inches; black fallow, 7.54 inches.

If there is more available water for the crop under stubble mulch fallow than under clean fallow, you might ask: "Why are yields often lower on stubble mulched fields?"

Add nitrogen

Oveson answers this way: There is more available nitrogen in black summer fallow than in trashy summer fallow. The nitrogen provided by the fallow is the result of the activity of certain soil bacteria, and these are more active in the warmer soils, providing moisture is present. Soil temperatures under the straw blanket are consistently lower than they are in the bare soil or black fallow. Lower temperatures mean less bacterial activity, and this means less nitrogen taken from the air by the nitrifying bacteria. Thus, there is less nitrogen available for the grain crop.

How can this be overcome? Answer: add nitrogen fertilizer.

Adding nitrogen to help wheat utilize the moisture saved under stubble mulch fallow means that stubble mulch will pay for itself in dollars—and also hold the soil in place.

Added nitrogen does other things, too. It helps to break the straw down into forms of organic matter that provide food for the nitrifying bacteria, and eventually for the wheat plant itself. Adequate nitrogen helps get wheat off to a good start in the fall, and that, too, helps prevent erosion. A good cover of any kind is a good erosion-preventive.

Experiments conducted in 1951 and 1952 at Pendleton have shown the need of nitrogen on stubble mulch. Different levels of nitrogen were applied to wheat grown on both trashy-fallow and clean-fallow plots.

Here are the 1951 yields in bushels per acre: trashy fallow—no fertilizer, 36.1 bushels; 33 pounds actual nitrogen, 47.2 bushels; 66 pounds nitrogen, 56.7 bushels; 100 pounds nitrogen, 56.7 bushels.

Clean fallow—no fertilizer, 39.5 bushels; 33 pounds actual nitrogen, 51.4 bushels; 66 pounds nitrogen, 55.8 bushels; 100 pounds nitrogen, 56.8 bushels.

Oveson reports the 66 pound nitrogen rate the most economical. Additional yield increases due to nitrogen did not pay for the higher applications. 1952 results were about the same.

Summing up the trashy fallow research for the past 15 years, Oveson says trashy fallow will hold the soil in place and prevent excessive water runoff. Adding nitrogen fertilizers will boost wheat yields to the same level that you might normally expect from adding nitrogen to wheat fallowed by common soil eroding tillage methods, such as black fallow or moldboard plowing.

Seeding difficult

Seeding, however, is another difficulty. When a lot of straw is left on the ground, proper seeding is difficult with an ordinary drill. When straw is not too heavy, the semideep furrow drill with 10-inch spacing does a good job. Standby drills which have been used on many stubble mulched farms are the 14-inch spacing deep furrow drill. This type has ample clearance to work through heavy mulch without plugging. All will work in heavy stubble mulched land after a skew treader has been used.

Once farmers get used to stubble mulch farming, Oveson thinks they will learn the methods of combating the inconveniences stubble mulch brings in controlling weeds and seeding. Then this system of summer fallowing may become commonplace in much of the Columbia Basin wheat land.

Stubble buster in action. Note how it breaks up straw. Next step is to work land with sweep plow. Skew treader not needed after buster.

Left is field stubble mulched with sweep plow, right field was mulched with disk plow. Field at the left will give greater protection from erosion.

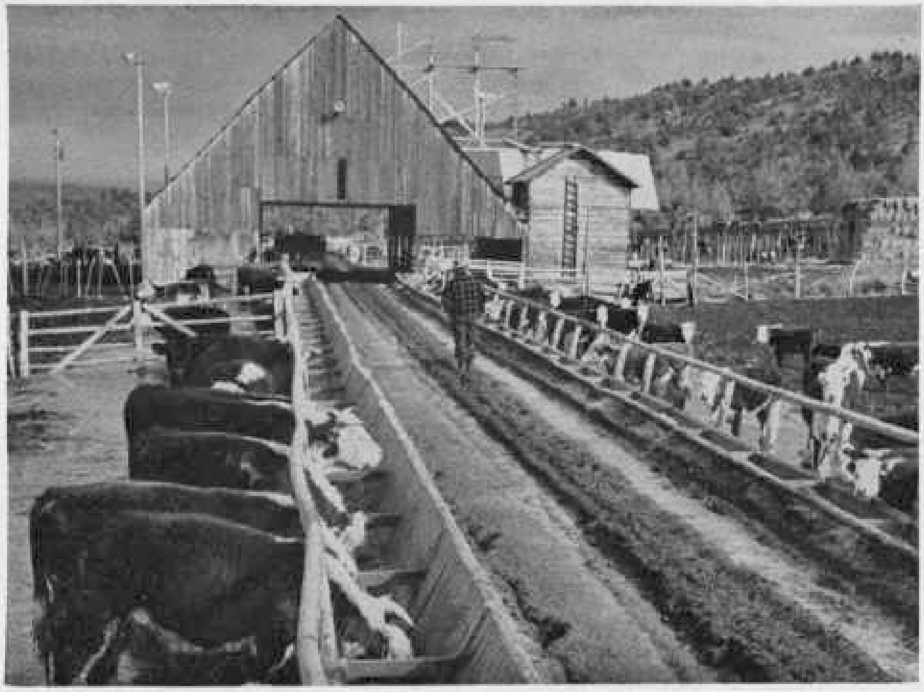


Figure Your Feeding Profits

Last fall's feeding trial at the Malheur experimental area started only as a demonstration of feedlot performance of different feeder grades. Interest in trial results has indicated that a complete story is needed. Among other things, the trial showed how feeding profits can be figured, and that guessing profit sources accurately will affect buying and management practices.

PROFITS from cattle feeding can be figured several ways. Many feeders merely subtract feed and other costs from total feeding income. But last fall's feeding trial at the Malheur Experimental Area showed the source of profit exactly.

Cattle were fed 140 days, from November 17 to April 6, according to superintendent Neil Hoffman. Fifty steers were divided equally into five feeder grades—choice, good, medium, common, and inferior. They were selected and graded by OSC extension animal husbandman John Landers, livestock marketing economist Ed Coles, and assistant Malheur County Agent George Bain.

Cattle purchased in eastern Oregon

The higher grading cattle were purchased directly from eastern Oregon herds. Steers in the lower grades were bought at auction.

Steers were started on corn and cobmeal, figured to supply 1 pound of corn per head per day, increasing to 2 pounds at the end of the first week. Grain was increased at 1 pound per head per week. The steers were held at 12 pounds of actual corn per head per day after January 24—9½ weeks after the trial started. After February 1, barley replaced 3 pounds of corn per head per day. Chopped alfalfa hay was fed free choice.

Animals were weighed in lots each month. In this test, animals showing a greater gaining ability were in the lower grades.

For example, average daily gains varied from 1.62 pounds per day for choice feeders to 1.86 pounds per day for common feeders—nearly a ¼ pound per day difference in gain!

Cattle were sold "on the rail" rather than alive. No labor costs were figured.

The results of the trial—and the lesson it gives to Oregon feeders—are told in the tables.

Where did the profit come from? From "selling" grain through livestock? Or from carrying cattle to a slaughter finish, thus cashing in on a favorable price difference between purchase and selling prices of lower grades?

These are two ways of figuring cattle feeding profits. The figuring depends on several items—price of feed, price of feeders, selling price of grain, and selling price of feeders.

The table at right shows where the profits came from in last year's feeding trial, according to agricultural economist C. W. Vrooman.

This breakdown shows clearly the source of profit: by feeding cattle to slaughter finish, and profiting from the difference between initial and slaughter weights in the lower grades. "Selling" grain through livestock and pushing them to higher slaughter weights proved a loss in this test, but Vrooman points out that in other years the reverse may happen.

The study shows other things when it comes to buying and feeding cattle. For example, gaining ability is just as important as conformation. In terms of management, it also showed that accurately "guessing" the source of feeder profits is important. Some years it pays to market grain through livestock, and profit from the gain in weight. In other years, like last year, it paid to get cattle to a better grade—slaughter finish—and profit from the difference between purchase and selling prices.

Source of Feeding Profit

Feeder grade	Lot 1 *Choice*	Lot 2 *Good*	Lot 3 *Medium*	Lot 4 *Common*	Lot 5 *Inferior*
1. *Profit by feeding grain:*					
Feed costs	$25.00	$22.00	$22.80	$21.00	$21.40
Selling price	21.47	21.03	21.01	20.45	17.58
Margin	-3.53	-0.97	-1.70	-0.55	-3.82
2. *Profit by initial cost—selling price difference:*					
Initial cost	17.10	15.50	12.95	10.92	7.93
Selling price	21.47	21.03	21.01	20.45	17.58
Margin	4.37	5.53	8.06	9.53	9.65

Feeding Trial Results

Feeder Grade	Lot 1 *Choice*	Lot 2 *Good*	Lot 3 *Medium*	Lot 4 *Common*	Lot 5 *Inferior*
Average cost *(per 100 pounds)*	$17.10	$15.50	$12.95	$10.92	$ 7.93
Average initial weight *(pounds)*	750.0	788.3	739.5	649.6	642.5
Average final weight *(pounds)*	986.8	1056.3	992.6	911.3	904.0
Average selling price *(per 100 pounds)*	$21.47	$21.03	$21.03	$20.45	$17.58
Total feed costs *(per 100 pounds)*	$25.00	$22.00	$22.80	$21.00	$21.40
Total profit *(per 100 pounds)*	$ 0.84	$ 4.56	$ 6.27	$ 8.98	$ 5.83
Slaughter grade *(on rail)*	*9 Choice 1 Good*	*6 Choice 4 Good*	*6 Choice 4 Good*	*2 Choice 7 Good 1 Commercial*	*1 Good 5 Commercial 4 Utility*

Below are two lots of steers the day they went on feed. Left are choice, right are common. See table above for lot which returned greatest profit.

Synthetic Milk - - - A Substitute For Sows

Two OSC researchers have found that you can raise baby pigs on artificial sow's milk. But several specific management practices are necessary before artificial rearing is successful. Rearing baby pigs artificially has several advantages. Here's a brief summary of their research findings.

Synthetic or artificial products have been rolling from various branches of American industry for several years. Agriculture, too, has had its share. Synthetic sow's milk is an example.

Basic studies about raising pigs on artificial sow's milk have been carried out at many agricultural experiment stations, mostly in the Midwest, the center of the nation's hog population. During the past two years, animal husbandmen Tom Johnson and J. E. Oldfield have tested artificial sow's milk under Pacific Northwest feeding and management conditions.

Raised more than 50 pigs

More than 50 baby pigs were successfully raised to market weight without the benefit of more than a few mouthfuls of sow's milk. They were removed from the farrowing pen shortly after birth and raised elsewhere. Various times of removal from the sow have been checked, and various ration combinations have been fed. Summing up their findings, here's what the researchers suggest:

▶ Baby pigs chill easily and need artificial heat when taken from the sow. A 250-watt lamp suspended two feet from their bedding works well.

▶ Baby pigs should receive the "first milk" or colostrum before switching to artificial milk. One or two nursings is enough, or they may be left with the sow for a day or two. The researchers found that it's difficult to raise pigs from birth without colostrum.

▶ Expensive and complicated feeding equipment — bottles, rubber nipples, etc.—are not essential. Baby pigs soon learn to drink from a small trough. A water fountain as used for chickens works well and doesn't upset easily.

▶ Thoroughly wash all feeding and feed-mixing utensils between feedings. Keep pens clean to lower chances of infection.

▶ Feed a good, well-balanced, fortified "synthetic milk" or "sow's milk replacement." A good ration should be high in energy and protein, low in fiber. It should contain concentrated sources of fat- and water-soluble vitamins, particularly vitamin A. It should provide minerals to supply baby pigs' requirements, but there shouldn't be too much mineral, since this reduces palatability. The composition of such milk may be compared to that of the normal sow's milk which is about 6.5 per cent protein, 6.75 per cent fat, no fiber, 0.96 per cent minerals and 565 units of vitamin A per pound. The finished product should mix into a uniform fluid when mixed with water, and the solids should not settle out too quickly. Several mixtures with the above qualities are available commercially.

► When first feeding artificial milk, warm to body temperature (about 98° F). This seems to attract the baby pigs. Once they learn to drink the mixture, feed it cold. But be sure to provide artificial heat for pigs when feed is cold.

► Too much milk at first is just as bad as too little. Baby pigs won't drink more than a few ounces the first day. Providing more is wasteful. Four to six feedings spaced throughout the day are recommended the first few days. After the first week, three feedings at regular intervals (8 a.m., 12 noon, and 4 p.m.) are enough.

► Reduce feeding costs by making dry pig starters available the third week. As baby pigs begin to eat more dry feed, reduce the liquid artificial milk diet. But provide water. Weaning to dry feed is completed when pigs are six weeks old.

Noted several advantages

The researchers noted several advantages from feeding artificial sows' milk:

1. Pigs may be "weaned" from their mothers right after birth, permitting quick sow rebreeding.

2. Sows don't need to produce milk, thus sow feed costs are lower.

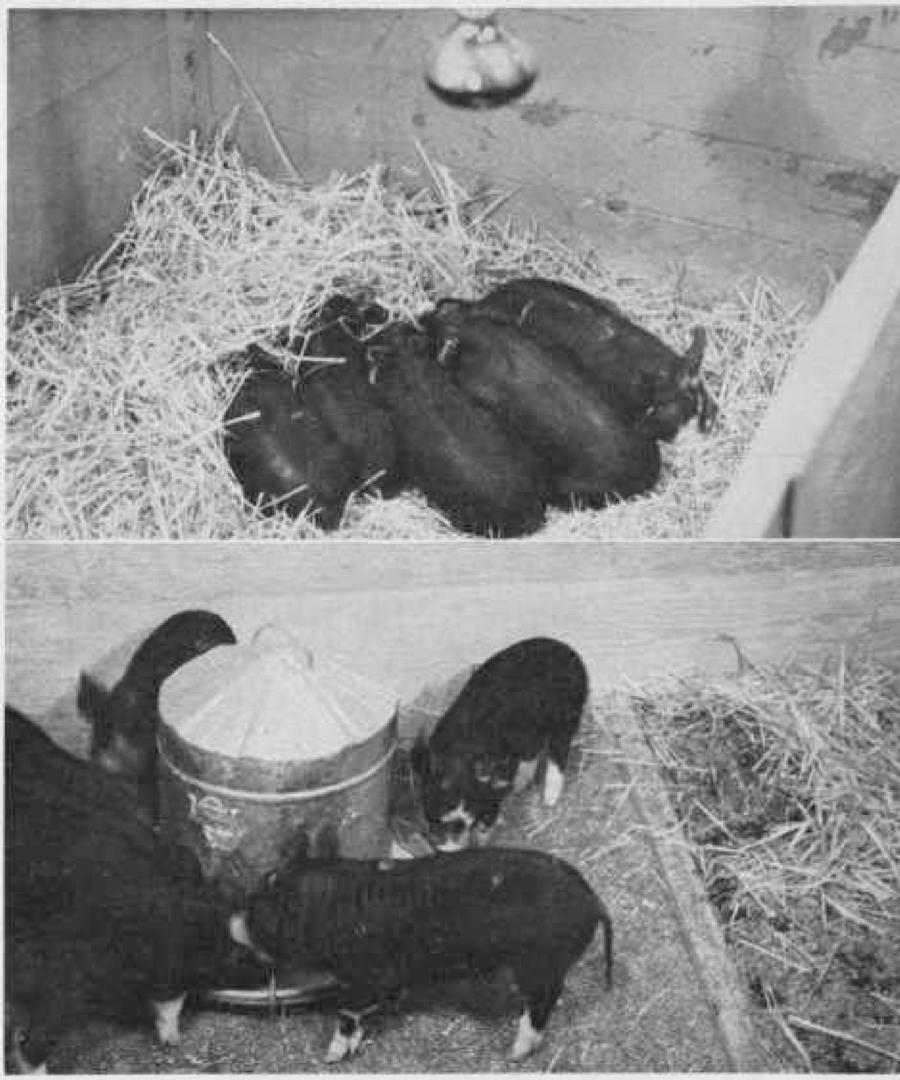
3. Natural litters often include one or two runts which cannot compete with their stronger brothers and sisters for the sows' milk. Raising runts artificially greatly increases their chance for survival.

4. In large litters there may not be enough room on the udder for all young pigs. These "extras" may be raised away from the sow on synthetic milk.

5. Occasionally, sows fail to give any milk. Good milk replacer and specialized management can prevent losses from this condition.

6. Sometimes it is difficult to regulate the sow's milk flow, and often the sow's milk production drops off while the baby pig's needs for milk are still increasing. You can adjust artificial feeding to pig's needs.

7. Feeding artificial sow's milk may lower the chances for transmission of disease from sows to their young.



Warmth is essential for baby pigs removed from the sow, as shown in top picture. Here, heat is supplied by a 250-watt infrared lamp suspended two feet from floor. Also, expensive feeding equipment is not necessary when rearing baby pigs artificially. Watering troughs above work well.

Will gain fast

Results from the researchers' trials show that baby pigs raised on synthetic milk will gain just as fast as those raised naturally. Although you can reduce feed costs by switching pigs from high-priced synthetic milk to dry feeds, Johnson and Oldfield found that a well-balanced synthetic milk is necessary as the starting ration. It doesn't pay to switch from synthetic milk to dry feeds too soon. Baby pigs begin to "pick" at a trough of dry feed when they are about 3 weeks old. They take a fair amount of feed by 4 weeks. It usually doesn't pay to reduce the feedings of synthetic milk before 4 weeks of age.

Also, the experimenters found that early sow rebreeding sometimes doesn't work too well. When sows don't produce milk to support litters, they often remain too fat.

Don't feed the sow "all she can clean up" after you have removed her litter. Cut her regular ration about one-third. This will help in two ways: it will reduce production of unneeded milk, and it will prevent her from becoming too fat for rebreeding.

Turkeys inoculated when they are 8 to 12 weeks old will be immune from erysipelas until market age. Inoculation may insure low range mortality.

Now You Can Control . . .

TURKEY ERYSIPELAS

A CONTROL looks promising for a turkey infection which has cost Oregon growers an estimated $100,000 to $150,000 a year.

The infection: erysipelas.

The control: a bacterin inoculation.

After 3 years of testing the bacterin manufactured by a commercial laboratory, poultry veterinarian E. M. Dickinson reports it has given good disease control among experimental flocks.

Erysipelas may show up as a highly acute contagious infection which causes death within a few hours or a few days. Or it may linger for several weeks, resulting in condition loss, but few deaths. In either case, it spreads rapidly and lowers profits.

Skin turns purple

Birds with the acute infection usually have a blotchy purple skin coloring over all or parts of their body. Skin covering the head and neck generally is a dark purple. An autopsy usually shows internal bleeding under the skin and in body muscles, in the heart muscles and heart fat, and in the intestinal wall. Sometimes the snood becomes swollen and firm—but this sometimes is an indication of fowl cholera. A lab test is necessary to find what is causing the swelling.

With lingering or chronic erysipelas, turkeys lose their appetite and develop skin breaks or lesions. The skin will show the usual purple blotches. Also, skin on the wattles, face, or breast may first turn brown, then become a hard, dark scab. After three or four weeks, the skin under the scab will heal over and the scabs will drop off, leaving a scar.

Penicillin cures sick birds

Dickinson says a single dose of 30,-000 to 50,000 units of penicillin has proved effective in treating sick birds—especially when they are treated in the early disease stages. Penicillin-streptomycin combinations also have proved effective. So has 100 to 150 mg. of streptomycin alone. Birds begin responding within 24 hours, and a second treatment is rarely needed.

Several years ago, poultry veterinarians observed that turkeys recovering from erysipelas were immune from further attacks. Scientists tested various strains of erysipelas bacteria as a vaccine. That failed, so workers began screening and testing various strains for their ability to produce immunity. Those that showed promise were held for further study.

After World War II, a commercial laboratory obtained four promising strains from Germany. These strains had been used for several years as an erysipelas-preventive bacterin in German swine. Through the U. S. Department of Agriculture, strains of the organisms were brought to the United States. Field trials were conducted in 1952-53 in areas where erysipelas is a problem—such as Oregon. The bacterin was released for turkey grower use in January 1954.

Inoculant provides immunity

In his tests, Dickinson found that turkeys inoculated with 2 cubic centimeters (cc.) of bacterin when 6 to 8 weeks old received about 90 days' immunity. Immunity continued when turkeys received a second 2 to 4 cc. dosage about 90 days after the first inoculation.

Immunity for birds inoculated when they were 12 or more weeks old did not last more than 60 days.

Summing up his and other work, Dickinson recommends:

1. Shake the bacterin for 2 minutes just before using.

2. Use a 2 cc. dosage for all birds up to 12 weeks of age. Eight to 12 weeks is preferred. In most cases turkeys reach the ideal age sometime during August and September. This will immunize them up to slaughter.

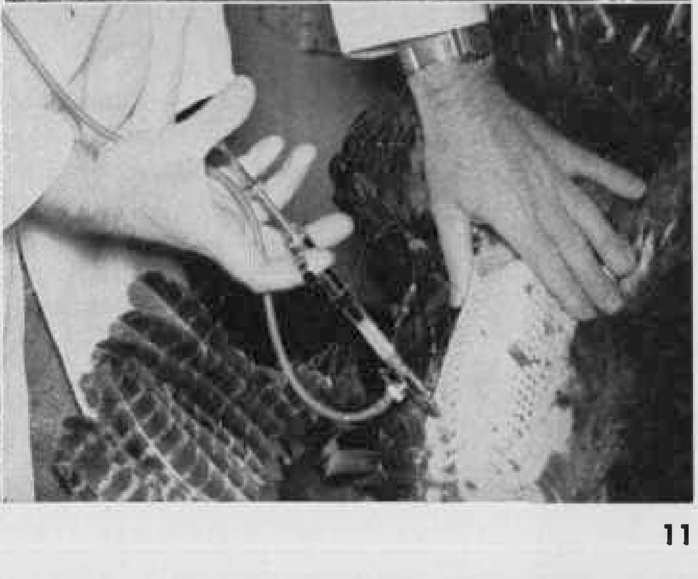
3. Give hens and toms that are held over as breeders a second inoculation when you are selecting them. Use 4 cc. for toms, 2 cc. for hens.

4. Stab the syringe equipped with a 1-inch, 18-gauge needle deep into the breast muscle. Inoculating the thigh muscles might work, but be careful not to injure bone or nerves, thus causing lameness.

The researcher adds that both bacterin and a self-loading syringe can be ordered through veterinarians, biological supply houses, and some feed stores.

Dickinson also warns against handling erysipelas-infected birds without rubber gloves. The bacteria can enter through cuts or scratches. Check with your doctor if painful swellings develop in fingers or hands 3 to 10 days after handling birds. Also, scrub hands in soap and water after autopsy, and paint any cuts or scratches with iodine.

Tom at right has erysipelas. Note swollen snood, scabby lower wattle. Below, pictures show inoculating procedure. Left, shake bottle before injecting bacterin. Right, stab syringe deep into breast muscle. Syringe is self-loading type. Best time to inoculate birds is 8 to 12 weeks of age.



Two OSC researchers report a clue to answer the question . . .

How Does Bracken Fern KILL CATTLE

For about 60 years farmers have been asking scientists, "Can bracken fern kill cattle?"

The problem was confusing. Young shoots had been used as human food and cattle had been seen eating fern without apparent harm.

But cattle losses kept occurring in areas where fern grew.

What was the reason? Was there something in the soil? Was it the pollenlike brown spores underneath the leaves? Or was it just superstition?

Much of the "fern poisoning" research yielded little to answer the question. In 1945, "fern poisoning" broke out in the Alsea valley of western Oregon. Fern on several hundred acres of cut-over and pasture land that had been shoulder high with fern was grazed heavily by cattle.

Many animals had died or were dying. Severely afflicted animals were listless and had high temperatures, and blood oozed from their mouths and noses—indicating internal bleeding.

Were these cattle victims of "fern poisoning?"

Yes, said veterinarians. But how?

Agricultural chemists J. R. Haag and Paul Weswig now figure that too much fern feeding probably killed these cattle—but they weren't "poisoned."

They base this reasoning on their rat feeding experiments. Rats were fed large amounts of powdered fern. Appetites failed and death resulted in 10 to 30 days. When smaller amounts were fed, rats lived longer, but finally developed convulsions, then died.

Died from vitamin B_1 lack

Investigation showed rats hadn't been poisoned. They had died from a vitamin B_1 deficiency. Then the chemists found that an enzyme in the fern destroyed vitamin B_1, and large vitamin B_1 doses cured and prevented vitamin B_1 deficiency symptoms.

They found other things about this vitamin-destroying enzyme. Dead fern no longer contained the enzyme, but air-dried fern had almost as much as live fern. Boiling fern killed the enzyme. Roots contained more of the enzyme than any other part of the plant.

Haag hasn't conducted controlled fern feeding experiments with cattle, thus isn't sure how bracken fern kills cattle. However, vitamin B_1 injections have been reported not to help cattle in advanced stages of fern poisoning. Once cattle show up with "fern poisoning" symptoms, there's little you can do.

Feeding extra vitamin B_1 to prevent fern poisoning of healthy cattle is not practical. Haag figures 1 acre of fern can destroy the vitamin B_1 in 500 tons of wheat.

When researchers find the cause of "fern poisoning," Haag thinks the vitamin B_1 destroying enzyme of fern may form a large part of the answer.

Best to prevent "poisoning"

Right now the researcher says it's best to prevent "fern poisoning." And that means preventing overgrazing. He thinks that animals will begin eating fern only when there's not enough grass or other forage. Also, fern seems to be habit forming. Once cattle begin eating it, they sometimes keep it up. Cattle brought into western Oregon often will begin eating fern before locally raised cattle eat it.

Haag points out that just a mouthful of fern won't topple livestock. Feeding trials at OSC and elsewhere show that it takes a heavy fern diet from 1 to 3 months to bring on "fern poisoning" symptoms. Exactly how much depends on your pasture and the amount of overgrazing. The best prevention, however, is to get animals to better pasture or to provide hay once you notice them eating fern.

Research Briefs

• Possible New Cherry Market • Cottage Cheese Keeping Quality Improved • New Oat Variety Released •

New Companion, High Yielding Oat Released to Klamath Basin Legume Growers

WINEMA, a new companion oat for Klamath Basin legumes, has been released by the Oregon Agricultural Experiment Station and the U. S. Department of Agriculture.

The spring oat has been tested since 1944 by A. E. Gross, Superintendent of the Klamath Experimental Area. Original cross (Magistral x Richland) was made by U. S. Department of Agriculture plant breeders in 1930 at Arlington, Virginia. The strain was selected at Ames, Iowa, in 1942 and grown at Aberdeen, Idaho, in 1943. A year later it was entered in testing trials at the Klamath Experimental Area.

Winema has a stiff, short straw, and lodges only under high fertility conditions. Since the variety is sparse-leafed, it shades the ground less than other varieties—making it adaptable as a companion oat for legumes.

Oat is rust resistant.

It is rust resistant and stands the irrigation necessary for clover and alfalfa. Winema also matures earlier than Cody or Markton. Seven years' testing shows it heads about 55 days after planting, almost a week earlier than other varieties.

The new oat also yields about 20 per cent higher than Kanota, the oat normally planted as a legume companion. An average of 7-years' yield data shows that Winema produced 101 bushels per acre, compared to 79 for Kanota.

But Winema has some disadvantages.

Its performance is not good on alkaline or muck soils of Lower Klamath Lake. Also, the new variety tends to shatter when threshed. With sparse foliage, it does not yield a large hay crop. The kernel test weight may be low, rating similar to Kanota.

Breeders seed of the new variety has been distributed to growers for increase this year, and foundation seed will be available in 1955.

Raising "Seed" Artificially May Help Spark Oyster Industry

Growing seed oysters artificially may help revive Oregon's native oyster industry.

OSC fish-research workers report they can raise native oyster larvae or "seed" experimentally in 12-gallon crocks.

Working at the College's marine-research laboratory at Yaquina Bay, W. P. Breese is now trying to raise them in 250-gallon wood tanks. The larger tanks are more practical for raising oyster larvae commercially.

Conditions are just right for natural oyster seeding about 1 year in 4 in Yaquina Bay. This has reduced oyster numbers too low for yearly harvesting.

Larvae microscopic in size

The larvae are almost microscopic in size. Soon after they're ejected from their parent's protective shell they swim around, finally attaching, then growing on hard, clean surfaces—such as old oyster shells. These 20 to 30 days are the most critical, and that's when death rate is highest. In Yaquina Bay, barnacles and other organisms foul much of the available attaching surfaces. Tides, changing water temperatures, and salt-content changes also take their toll.

By rearing oysters artificially in wood tanks—where food and water can be purified and regulated—Breese is raising oysters from free-swimming larvae that will "set" and grow on hard surfaces, usually oyster shells.

He's run into several problems, though. One, wood tanks leach a material that kills some larvae before setting. Another is regulating food and rearing water. Oyster foods—microscopic, one-celled organisms such as bacteria—need much care if they are to survive in salt water.

Salt water must be filtered to remove prey that would kill larvae or compete for food.

If Breese can raise oyster seed artificially in larger tanks as he can now in experimental 12-gallon crocks, commercial native oyster production could be boosted in many Oregon bays.

W. P. Breese, OSC marine researcher, checks "set" of oyster larvae being raised artificially.

Research Briefs...

Study Shows Wheat Costs Average $1.61 a Bushel

By increasing wheat yields only 1 bushel an acre, 18 Wasco County wheat farmers could have upped their average farm income $914 per farm.

This was brought out in a wheat-producing cost study of 18 sample farms of Wasco County dryland wheat farmers in the 1952 crop year.

Agricultural economist D. Curtis Mumford says the $914 is only an average figure among those sampled.

Results also show that wheat costs averaged $1.61 a bushed, with wheat selling for $2.23 a bushel. Wheat production costs, however, varied from $1.20 to $2.32 a bushel between high- and low-cost operators.

Wheat planted to 440 acres

Farms averaged 1,708 acres, with 910 acres in cropland and 798 acres in range. Cropland was about equal in fallow and in crop acreage. Wheat was planted in 440 acres, but some of the wheat harvested was held for seed and feed.

Out-of-pocket costs made up 48 per cent of the total farming costs. This included hired labor, custom work, repairs, fertilizers, weed control, seed, seed treatment, livestock, and taxes. Other costs included allowing the farm operator a $3,600 salary, depreciation of equipment and buildings, plus 5 per cent on capital.

Mumford points out that the $1.12 variation in wheat costs is largely the result of management differences. Also, the above figures are not necessarily representative of other Oregon wheat producing farms or wheat producing areas.

Some farmers more efficient

Better management and efficiency were shown when costs and yields were compared between the 9 high-income and the 9 low-income farms.

Wheat producing costs per acre were about the same—$26.52 for low-income farms, $27.03 for high-income farms. Yield per acre, however, was 27 bushels for low-income farmers, 36 bushels for those with high income.

Higher income wheat farmers also had more cropland, averaging 1,155 acres, compared to 663 acres for low-income farmers. High-income farmers received $40.75 per cropland acre, while low-income farmers received $28.42.

Net profit showed wide differences between the two groups. Low-income farmers averaged $1,260, while high-income farmers averaged $15,857.

Prevent Early Cottage Cheese Spoilage

Cottage cheese manufacturers now can market a better flavored product with excellent keeping quality, thanks to results from two years research by OSC bacteriologists P. R. Elliker, R. B. Parker, and V. N. Smith.

In recent years, dairy manufacturers have been troubled with early cottage cheese spoilage. Flavor changes—caused by bacteria—were turning fresh-tasting cottage cheese fruity, rancid, bitter and flat. In later stages, the bacteria formed a slimy, yellow film over curd particles, making the product unmarketable.

Bacteria grow at low temperatures

The bacteriologists found that three kinds of bacteria were the culprits. The bacteria were unusual—they were able to grow well at refrigeration temperatures.

The researchers also found that most of these bacteria got into the cottage cheese through the manufacturing plant's water supply. Besides plant and municipal water supplies, they were found in dairy plant surge tanks, in holding vats, in pasteurized milk lines, in cottage cheese vats, in packaging equipment such as cottage cheese fillers, and in cans that hold creaming mixtures used in making creamed cottage cheese. But bacteria usually entered the plant through the raw milk or water supply and found their way to various pieces of dairy plant equipment. Natural source of the spoilage bacteria is in soil and water.

Elliker, Parker, and Smith found that by chlorinating wash water and regulating curd acidity, cottage cheese producers could control the spoilage bacteria and market a fresh-tasting, spoilage-free product.

In addition, the bacteriologists worked out special methods for cleaning and sterilizing all plant equipment to prevent spoilage bacteria from entering cottage cheese through plant equipment.

These methods—chlorination of cooling water, regulation of curd acidity, and better plant cleaning and sterilizing—now are being widely adopted by cottage cheese manufacturers throughout the country.

Fumigating Cherries May Tap California Fresh Market

A new market for Oregon-grown bing and Lambert cherries may open up soon.

OSC entomologist S. C. Jones reports that fumigating cherries has killed 100 per cent of cherry fruit fly larvae and pupae.

Cherries for the fresh market cannot be shipped into cherry fruit fly-free states, such as California. Jones figured that if his fumigating tests showed that all of the fruit fly's larvae and pupae were killed, commercial interests might ship the popular cherries to the untapped California fresh market.

Tests last year showed that ethylene dibromide gas—about ½ pound of liquid fumigant per 1,000 cubic feet—killed all of the pupae and larvae. The researcher fumigated for 2 hours.

Taste tests of fumigated cherries showed there was a slight flavor change four days after fumigation, but the tests also indicated flavor changes were less each day after fumigation.

To test killing power on eggs

This year Jones is testing the fumigant's killing power on fruit fly eggs, and probably will carry out more complete taste tests.

Practical refrigerator-car fumigating methods on a commercial scale have yet to be worked out. When they are, Jones predicts new markets for Oregon-grown fresh cherries.

Farm Outlook

• Grain & Hay • Beef • Hogs • Lambs • Poultry & Dairy • Mid-year Look at Business & Farming •

By Agricultural Economist M. D. Thomas

THE SECOND half of 1954 should be no worse than the first half for American farmers and businessmen. It may be better.

True, industrial production in this country has dropped about a tenth from the all-time peak reached a year ago; and fewer people were working during the first quarter of this year.

But taxes have been reduced, and total take-home pay of workers and businessmen has held close to the annual rate of 250 billion dollars reached during the third quarter of 1953. This record "ability to buy" keeps domestic demand strong.

Consumers' "willingness to buy" also continues great. Personal spendings dropped only slightly as the concern for jobs increased and consumer debts were reduced moderately.

At mid-year, many businessmen were showing new willingness to take chances, too. Loans were usually costing less and were easier to get, most inventories had been reduced, manufacturers' new orders were increasing, and new construction was continuing at record rates. Then, too, business during the first half of the year hasn't been as bad as many feared. This adds confidence and stimulates new activity. Last, but not least, fears of the effects of reduced defense spending are being offset by new shows of tenseness in international affairs.

Exports are likely to hold fairly stable during the next 6 months.

These conditions seem to be assuring a continued strong demand for farm products. But they don't necessarily mean prosperity for farmers. They don't add up to higher prices or larger incomes for all products. As a matter of fact, prices and income prospects vary widely as we enter the second half of the year. Some products will bring more, others will bring less than last year. Why? To some extent, because of changes in price supports. But mainly, changes in supply prospects are the big reasons.

Hogs

Hogs will be an example of larger supplies forcing lower prices during the second half of the year.

The nation's spring pig crop is now estimated to be 13 per cent larger than last year. This probably means about 10 per cent more pork this fall. More gilts will be saved this year and hogs probably will be marketed at lighter weights. With declining prices, it won't pay to hold fat hogs as long as last year. Prices may be a third lower by October, but still favorable in relation to barley at $40 a ton.

This looks like a year for cow-calf operators to market cull cows and commercial feeders early.

Hog raisers are almost certain to be producing for a falling market for 2 or 3 years. Including fall farrowings, this year's pig crop will be around one-eighth larger than last year, but still a tenth below the record 1951 crop which pushed prices into the unfavorable column through 1952.

Cattle

Feeder cattle prices may not hold. Profits from the past season's feeding operations and prospects for lower feeding costs plus new threats of war have given early strength to the grass cattle market. Feeder's optimism may be tempered later by larger supplies and lower prices for pork and record numbers of cattle and calves. Movement of stockers and feeders into Corn Belt states during the first half of this year was nearly 40 per cent greater than a year earlier.

Unless something like war gives the economy a shot in the arm, this looks like a year for cow-calf operators to turn cull cows and common feeders early—even though pasture and range are good. Forage can be wasted if bunched marketings break prices later.

Cattle feeders need to figure closely for the coming fall and winter. Buying needed hay and grain at harvest time and basing bids for feeder cattle on fat cattle prices a little lower than those of the past season look best. War would bring some rise in fat cattle prices. Otherwise, larger supplies of beef and more poultry and pork could force prices lower. Don't be in too big a hurry to buy feeders. There are plenty to go around; and time is in your favor. Short-feeding could be safer than long-feeding this year. This means using good feeders in good condition. *Later in the season, common feeders in poor condition could do best if prices spread as they did last year.* (See story, page 6.)

Lambs

Lambs will decline seasonally during the summer and fall. Top-out every week or two and try to close a deal on your feeders by September 1. That way you don't have to risk the effects of larger pork and beef supplies. Speculating on a few good ewe lambs looks better than holding feeders, especially if wool legislation is as favorable as seems likely.

Poultry & dairy

Turkey and egg producers will be doing well to make ends meet this year.

(Continued on next page)

TO

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Farm Outlook . . .

Eggs from young layers were bringing around 18 cents a dozen less than a year earlier in Portland this June. The seasonal price rise was slow in starting this year, and probably will end earlier than usual this fall. Early hatches were large in the Midwest. That's hurting egg prices from Portland, Oregon, to Portland, Maine.

Turkey numbers will be larger this year, too. Just how large won't be known until the Crop Reporting Service's August survey is out. But prices around 10 per cent under a year earlier prevailed at mid-year.

Milk is plentiful. Butter and cheese continue in surplus. Lower prices haven't had time to affect production much. They are increasing cheese consumption but helping butter little. A dent has been made in government holdings of dry milk through sales for livestock feed.

It's pretty clear that good cows of the past will not be good enough for the future. Cull closer. Keep high milk producers. This can mean greater net returns per farm—*even with less milk marketed.*

Grain & hay

Wheat keeps piling up. We could easily have a billion bushels of wheat still on hand in this country at the end of next June. This doesn't necessarily mean distress prices for Oregon's 1955 crop, *if storage can be found and if Congress makes good on price support money.* But it does demonstrate that super-marketing isn't going to solve our wheat problem quickly. The wheat from a 62-million-acre national allotment is more than we can market in usual ways.

Undoubtedly, present supply prospects make wheat-for-feed more certain. Barring all-out war or extreme drouth, wheat at feed prices is certain by late '55 or early '56. Feed wheat prices may come in through the front door in the shape of something like the income-certificate (two-price) plan. Or, they may come through the back door in the form of government "fire sales" on weedy, smutty, damaged, or contaminated grain.

There may be much "hot" wheat in 1955, too. Some farmers are considering planting "excess" wheat and paying the penalty. They feel they would make more money this way than with any other crop on the "diverted" acres.

Until we have priced 300 to 500 million bushels of wheat a year into the feed market, we seem likely to have both controls and surpluses. Getting this wheat fed would take prices at 50 to 60 per cent of wheat parity as now figured. This means $1.25 to $1.50 a bushel on the basis of present prices and costs of other things.

Barley still looks plentiful this year with a big acreage in Oregon and other states. Harvest-time prices will drop well below $45 to $55 a ton loan rates, then advance some as the crop finds cover. Premiums for malting quality may be small. More has been planted in the Midwest. California's crop is large.

Oats, at moderately lower prices than last year, is still in the picture.

Corn is off to a good start in most states. More "free" corn on farms that exceed allotments means prices well below supports for some time after harvest. This will keep all feed grains from going above supports, even though more poultry and pigs increase use.

Hay generally looks plentiful this year, but there may be short spots. The season started with more hay left in Oregon barns and stocks than a year ago, despite drouth shipments. With less sign of drouth this year, prices $2 to $4 a ton under those received for the 1953 crop may be all you can get.

"Cross-compliance" will reduce barley and oats plantings for 1955 and encourage more hay and pasture.

Potatoes & onions

Oregon potatoes going to market during the July-September quarter are headed for better prices than last year. Onions will bring more, due mainly to production cuts. Holding the late potato and onion crops beyond September looks like good business if national production drops 10 per cent or more from last year. Otherwise, selling at harvest could be best. Take your cues from USDA monthly crop reports.