Oregon's Agricultural PROGRESS

Select for Faster Beef Gains
Do Cloud Seeders Make Rain?

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COVER STORY: It's possible to select cattle that can pass on to their offspring ability to convert less feed into more beef in less time. Read how it's done, page 8. (Photo: Ray Atkeson)

WE ARE ROLLING into the last half of 1955 with economic activity setting a rapid pace. There is little sign of slowing in sight for the next 6 months.

For business and labor, the first half of the year has been even better than most expected. The second half may be as good.

For farmers, the first half has been only fairly good. It brought some further decline in prices and incomes on one hand and slightly higher costs on the other. The second half is likely to bring more of the same, although some items—like eggs—should do better this summer and fall.

Business

Farmers would be much worse off if business and labor were not doing so well. Business makes payrolls. And payrolls put clothes on backs and food on tables, especially meats which we are now geared to produce in larger amounts. Then, too, business and industry make jobs that attract people away from farming and lessen competition for those that stay on the land.

Competition is one thing everyone seems to have plenty of these days. This is true off as well as on the farm. Despite today's high level of activity, few businessmen have as many sales or as much margin as they would like.

Then, how good is business? Ask your grocer, your hardware man, your service station operator. If they are like mine, they'll reply, "Not good enough."

Ask an economist, and he will say, "On the whole, quite good compared to what we have had most of the time in the past—maybe a bit better than we can expect most of the time in the future."

Figures show Americans are now earning and spending at record rates. New orders have built up in manufacturer's hands as retail sales hit new highs this spring. Industrial production has climbed back out of the '54 slump and is now crowding 1953 all-time peaks.

Construction continues at record levels. Industry is upping its spendings for new plants and equipment but may not equal the boom year of 1953. The federal government has cut back on spending but much of this slack has been picked up by state and local governments.

by Agricultural Economist M. D. Thomas

Farm Outlook

True, people have dipped into savings or borrowed money, as spending has increased faster than income recently. Many are heavily committed on homes, automobiles, and appliances. A let up in purchases of these things can slow business down rather quickly.

Farming

While markets and margins are not all we might choose, moisture is less concern to Oregon farmers than seemed likely earlier. April brought more than showers—it brought much more than usual in the way of rain and snow over most of the state. With a fair break from the weather during the rest of the season, we should have near average field crops and the largest tree fruit crop in several years.

April weather slowed pastures and lengthened the hay feeding season but improved prospects for the new hay crop. June weather in western Oregon was much better than usual for hay making. More wheat and barley are being made into hay in the Columbia Basin counties where cattle feeding is increasing rapidly. Despite increasing needs for forage, hay prices may not advance like they did last winter. One reason: Prices are starting higher this year. Also, odds are against another late spring.

HOG RAISERS are likely to benefit from large supplies of grain at lower prices. Sow and pig prices probably will be higher than usual, compared to fat hog prices, but buildup will be slow.

Feed Grains

Supports on Oregon's 1955 barley crop will be $9.58 a ton under last year. Oat supports will be down $8.13 a ton. With large carryovers from last year, another big planting this spring, and Midwest corn off to a good start, markets at harvest time seem likely to follow supports down. Feed grain prices already are the lowest in 5 years.

In Oregon and the Northwest, feed grain supplies are likely to be especially large compared to past years. Carryover plus new crop is likely to give us fully twice as much as we had 2 years ago.

Wheat

On top of our barley and oats, we are likely to have more wheat priced into our feed grain market by a year from now. Lower supports probably will make wheat competitive with corn in the Northwest if not elsewhere. Tighter regulations on storage and sanitation will head more wheat toward feed grain outlets too.

Remember, sanitation starts on the farm. That goes for wheat from here on out, under rules of the U. S. Department of Agriculture and Food and Drug Administration. This means keeping out rats, mice, birds, and bugs. Use sheet metal or screen on all openings. Don't mix new grain with old grain unless you must and are sure old grain is insect-free. Store in clean, weather-tight, ventilated structure.

1955 wheat won't qualify for price supports if (1) it contains more than two rodent pellets, or the like, in a pint, or (2) two per cent or more, by weight, of insect-damaged kernels.

So look at the condition of your storage and avoid losses that total close to $250 million a year nationally.

Cattle

Much of the benefit from lower feed grain prices will go to producers of stocker and feeder cattle during the next few years. Already feedlot operators are worrying more about the price of feeder cattle than the cost of feed grains. One thing or another seems to keep the squeeze on margins.

(Continued, page 16)

MORE WELL-DESIGNED experimentation is needed before man is reasonably certain cloud seeding will work, or knows how much weather he can control.

For several years, man has tried to influence Oregon's weather. Three OSC meteorologists who have evaluated one commercial cloud seeding effort in the Tri-county area from 1950-54 say it's most probable that . . .

NATURE WAS THE RAINMAKER

SINCE WORLD WAR II, commercial cloud seeders have been trying to increase rain or decrease hail in Oregon. Many claim success—without proving such weather differences are due to their work.

Research evaluating one such effort has just been completed by OSC meteorologists Russell Lincoln, Fred Decker, and John Day.

The area: 2,642,000 acres in Sherman, Gilliam, and Morrow Counties. About half is planted to wheat.

The time: 1950-54, with cloud seedings conducted each year from September 1 to June 30.

Much of the evaluating research went into developing a method for accurately detecting if commercial cloud seeding operations increased or decreased rainfall in the area. Rainfall over the past 20 years varied from 5.8 inches in 1938 to 16.6 inches in 1947, averaging 10.5 inches. With this range, the meteorologists were faced with developing an evaluation method that would:

¶ Adjust automatically for the tremendous changes that might occur naturally.

¶ Detect the change that might be due to cloud seeding.

Why rain falls, and how man *might* control part of it, is not yet completely understood. Meteorologists have pretty well settled on one theory:

A rising current of moist, invisible air is the essential ingredient. While rising, it expands, becoming cooler. At cooler temperatures, less moisture can exist as invisible vapor, so it begins condensing as visible water droplets. Thus, a cloud is formed.

Continual climbing of air containing these cloud droplets may result in cooling to the freezing point (32° F.). Liquid droplets do not always freeze at 32 degrees, but may become "super-

cooled," remaining a liquid below the usual water freezing temperature. This same air usually carries small, solid particles, primarily dust (called nuclei), on which moisture may begin building. Since the temperature is below freezing, this moisture appears as ice crystals.

Then changes begin within the cloud. Crystals grow at the expense of liquid droplets, forming snow flakes, while liquid cloud droplets shrink and finally vanish.

Snowflakes fall as they grow larger, eventually reaching the warmer layers of air near the earth's surface. Here they may melt and fall as rain.

Nature varies the number of dust particles or nuclei she provides. And cloud seeders try to correct any deficiency by seeding clouds with artificial nuclei such as silver iodide smoke.

Attempts to reduce the amount of rain or hail also are based on the idea that if too many nuclei are provided, there won't be enough water available in a super-cooled cloud for many of the ice crystals to grow into snow flakes.

Many meteorologists suspect, however, that conditions under which cloud seeders can produce rain, and nature can't produce rain, aren't common.

Silver iodide smoke used

Silver iodide was the chemical used to produce nuclei in the Tri-county area.

To find if these seeding operations actually increased rain in the area, the researchers measured some 11 items that are connected with natural rainfall.

Weather Bureau data gathered 4 years before any cloud seeding attempts (1946-50) were fed into IBM computers. Using a statistical analysis new to cloud seeding evaluation, the three meteorologists could then figure how much rain should have occurred naturally, based on daily 1950-54 data. If more rain fell, it could be due to some other reason, possibly cloud seeding.

No increase due to seeding

The result: no definite increase due to cloud seeding. The researchers say an increase of about 16 per cent over what they computed would have fallen naturally was necessary before cloud seeding could be considered effective. Variations less than 16 per cent could occur too often by chance alone.

For the 1950-54 cloud seeding period, this computed value was 10.99 inches per 10-month season. If an average of 12.60 inches per season had fallen, the meteorologists could conclude something beside chance, presumably cloud seeding, had caused the increase.

Actually, 11.58 inches per season fell in the area. Since this was below 12.60 inches, the three workers could not say the increase was due to seeding.

What were these 11 items used to compute natural rainfall?

They included the upper air temperatures, pressures, and humidities at four Pacific Northwest sounding stations, plus a measure of the rainfall in a nearby area whose clouds were not seeded.

Upper air-sounding stations were located at Tatoosh Island, Spokane, Boise, and Medford. Stations in the nonseeded area were at Portland, Salem, Corvallis, and Eugene. Daily data were gathered for two heights: 6,500 and 10,000 feet. Measurements at the two heights were used to catch moisture-bearing air currents traveling at those altitudes.

Temperatures are important in revealing the chances of having supercooled water droplets, the likelihood of rising air currents, and the capacity of air to hold moisture. Pressures indicate nearness of storm centers plus wind directions. Humidity indicates the amount of moisture in the air. And rain gauges in a nonseeded area report the ability of nature to make rain.

From the daily data measuring the above items, Lincoln, Decker, and Day were able to arrive at the conclusions stated above.

Hoped to experiment

At the beginning of the evaluation, the researchers had hoped actual experimentation could be conducted so the science or art of weather control, especially rainmaking, might be advanced where it would help Tri-county and other farmers.

The evaluation itself developed into an improved method of detecting possible rainfall differences due to cloud seeding. But further experimentation is necessary before man can be reasonably certain cloud seeding will work, and before he can find how much weather he can control.

Photo: U. S. Air Force

POSSIBLE RAIN that should fall naturally was figured from upper air soundings of four stations.

COMPUTED RAIN was figured by IBM equipment to find if seeding influenced rainfall amounts.

ACTUAL RAIN is measured daily by many unpaid weather observers like Mrs. Olive Mott, Summit.

Nitrogen *Does* Improve

WHEAT QUALITY

As yields of soft white wheat rise, protein content should not reach undesirable levels. Until yields level off, protein content is in a desirable range.

NITROGEN was needed on 36 of 48 farms to increase

NITROGEN APPLIED to soft white wheat in the Columbia Basin not only can boost yields but can improve quality—up to a certain point.

And that point is when yields level off, reports Albert S. Hunter, OSC and U. S. Department of Agriculture soil scientist. He says any nitrogen added after yields have reached their peak will increase protein content, perhaps to undesirable levels.

Millers prefer soft white wheat with a protein level from 8 to 10 per cent. Protein much above or below this range means poor quality pastry flour.

While nitrogen affects protein content little while yields are rising, it sometimes boosts it into the desired range.

Trials started in 1954

Hunter bases the above reasoning on trials set out last year on 48 farms in Wasco, Sherman, Gilliam, Morrow, and Umatilla Counties. Workers at the Sherman and Pendleton branch stations, county extension agents, and extension soil conservationists helped gather data.

Each farmer "loaned" a half acre. And each trial consisted of 15 fertilizer treatments, with 5 rates of nitrogen applied in spring and fall.

FERTILITY TRIALS will be continued until researchers gather enough data to determine the relation of nitrogen and other items to wheat yields.

yields, and on 21 of 36 farms to bring protein content up to the range most millers desire—8 to 10 per cent.

Nitrogen was needed on 36 of the 48 farms to increase yields; on 21 of the 36 to bring protein content up to the desired range.

Samples from only 3 of the 48 tested above 10 per cent protein. Added nitrogen decreased yields while protein content increased. On the remaining farms no nitrogen was needed, and protein levels remained in the desired range.

Besides testing time and rate of nitrogen applications, Hunter and coworkers added 50 pounds of phosphorus and 50 pounds of sulfur to all plots. Phosphorus increased yields on only two farms, sulfur on one (recropped spring wheat on the Crow Pilot Farm near Weston).

Time of application results varied

Results on time of application varied. On 21 farms, there was no difference. Fall-applied nitrogen upped yields more than spring-applied on 15 farms, while the reverse was true for 12.

The table below gives county-wide averages, *but Hunter cautions against using them as recommendations.* They are presented here to show that, in general, protein levels don't rise to an undesirable range while yields climb.

The only results not shown in the table are from trials conducted in Umatilla County's high rainfall area where the following yields and protein per cent per acre were recorded for each nitrogen level:

Nitrogen level *Pounds*	Yield *Bushels*	Protein *Per cent*
0	24	7.7
30	37	8.2
60	41	9.7
90	41	10.7
120	39	13.5

Test weights ranged from 56 to 63 pounds per bushel. But most sample weights fell between 58 and 62 pounds.

Soil differences important

Hunter says no Basin or county-wide fertilizer recommendations can be made from the data. Differences in soil type, depth, in rainfall, and in available soil nitrogen between individual farms within a county were enough to affect rates and yields.

Rainfall and the other items are important guides for measuring nitrogen needs. The importance of each is now being studied to find a better method of predicting individual nitrogen needs.

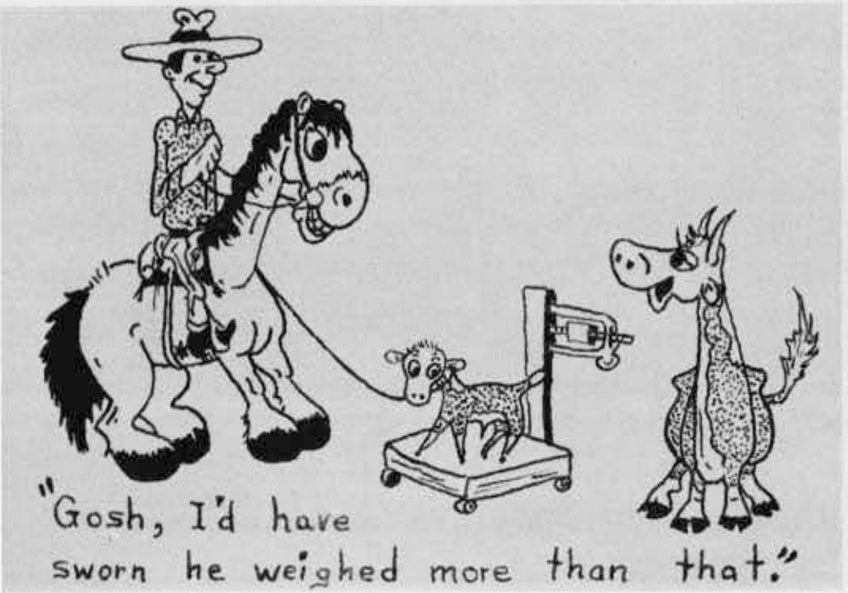
Further tests of fertilizer effects on yields, protein content, and test weight will be continued until the research workers have enough data to nail down the exact relation rainfall and soil type, depth and nitrogen have on wheat yields.

Nitrogen Improves Wheat Quality Only While Yields Increase

Fertilizer rate	WASCO		SHERMAN		GILLIAM		MORROW		UMATILLA	
	Yield per acre	Protein	Yield per acre	Protein	Yield per acre	Protein	Yield per acre	Protein	Yield per acre	Protein
	Bushels	*Per cent*	*Bushels*	*Per cent*	*Bushels*	*Per cent*	*Bushels*	*Per cent*	*Bushels*	*Per cent*
0	19	7.0	31	6.2	27	8.1	26	7.9	22	7.7
20	25	7.3	38	6.4	29	8.3	28	8.8	26	8.6
40	29	8.1	44	7.3	31	9.2	28	10.7	30	9.5
60	31	9.2	45	8.2	30	10.0	28	12.3	31	10.8
80	33	10.4	47	8.8	31	10.8	26	13.3	31	11.6

SELECT FOR *FASTER* BEEF GAINS

Animals vary more within a herd than among herds in their inherited ability to convert feed to beef efficiently.



1 **BIRTH WEIGHT** is needed to compute rate of gain from birth to weaning. Big calves are more likely to survive, gain faster, and require less feed per pound of gain than are small calves. Big, early calves also make greater use of spring grass, better use of greater milk flow.

CATTLE THAT put on more beef with less feed — it's possible — through genetic selection for gaining ability.

Six years research by OSC animal husbandman Ralph Bogart shows good-doing bulls and heifers can pass on to their offspring the ability to:

¶ Gain as much as half a pound a day more.

¶ Put on 100 pounds with 100 pounds less total digestible nutrients (TDN). TDN is a measure of actual feed value. For example, 100 pounds of TDN equals 116 pounds of hay and 58 pounds of grain. That's what you save along with putting on beef faster.

Of OSC's four lines, Bogart got his best gaining ability from the British-imported Lionheart line. At first, bulls gained only 2.3 pounds per day, took 460 pounds of TDN for 100 pounds of gain. After 6 years of selection, bulls gained 3.12 pounds per day, used only 341 pounds of TDN per 100 pounds. The story for heifers was similar: 1.70 pounds per day initial gain, 2.34 after 6 years. TDN per 100 pounds gain dropped from 572 to 505.

And you can get this gaining ability and increased feed efficiency into your breeding herd by following the steps explained under the cartoons.

Bogart explains why the procedure will work: Animals vary a lot in their ability to convert feed to beef fast and cheap. Although some of this is due to the way they are handled, they still must have the inherent ability to put on beef rapidly and efficiently even when they are managed well.

Take advantage of inherited ability

The researcher is looking for a way to take advantage of this inherited ability, which varies more within a herd than among herds. Ability to convert feed to beef rapidly and cheaply is governed by genes, invisible inheritance units.

Although the exact makeup is not completely known (like it is for flower color), research to date has found that a rancher can combine the favorable characters he wants in a bull or cow, thus improving his herd's overall gaining ability and efficiency.

Although these methods may seem expensive and bothersome, the rewards for selling feeders with this gaining ability are reflected in higher feeder prices. Most any cattle buyer will pay more for feeders that he knows will consistently convert feed to beef cheaper and faster than the average.

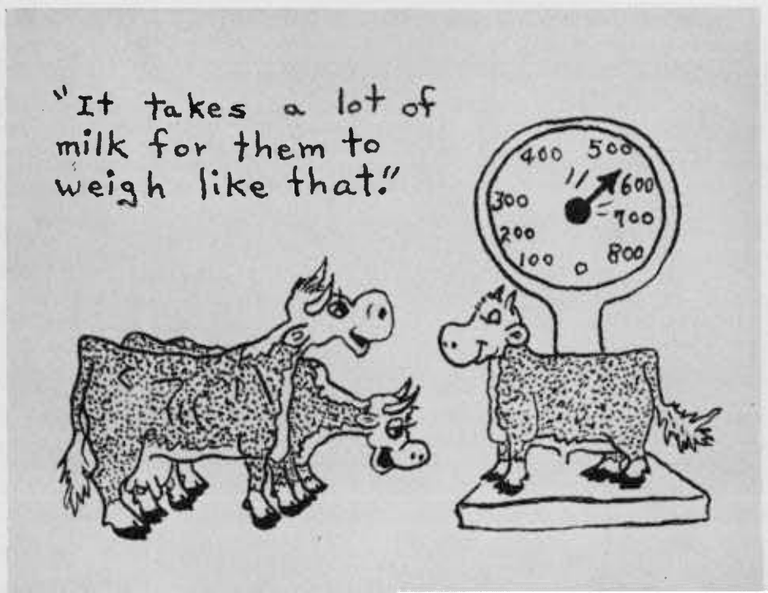
Selection means higher profits

For the feeder himself, Bogart reports such selection can bring considerable saving. For example, suppose you are feeding two cattle groups the same ration for 150 days. Group one animals need 500 pounds of TDN per 100 pounds of gain; they put on 2 pounds of beef per day. Group two animals use 400 pounds of TDN per 100 pounds gain; they put on 2.5 pounds per day. At the end of the feeding period, group two animals thus gained 75 pounds more with the same amount of feed compared to group one animals. At 22 cents a pound, this means $16.50 per animal.

About 40 ranchers are cooperating with their County Extension Agents and OSC in conducting production-testing programs. Others wishing help can get advice and records from the OSC extension service.

5 **GRADE** is important since market price is based largely on quality. Quality, conformation, and efficient gaining ability are important inherited characteristics. Grading your "good-doers" at weaning, yearling, and 18-months is suggested before you select the herd replacements.

2 **WEANING WEIGHT** separates heavy and light weaners. And heavy weaners indicate the cow's milking ability—important in beef cattle selection. Figure a calf's average gain by subtracting weaning weight from birth weight; then divide by the animal's age in days.



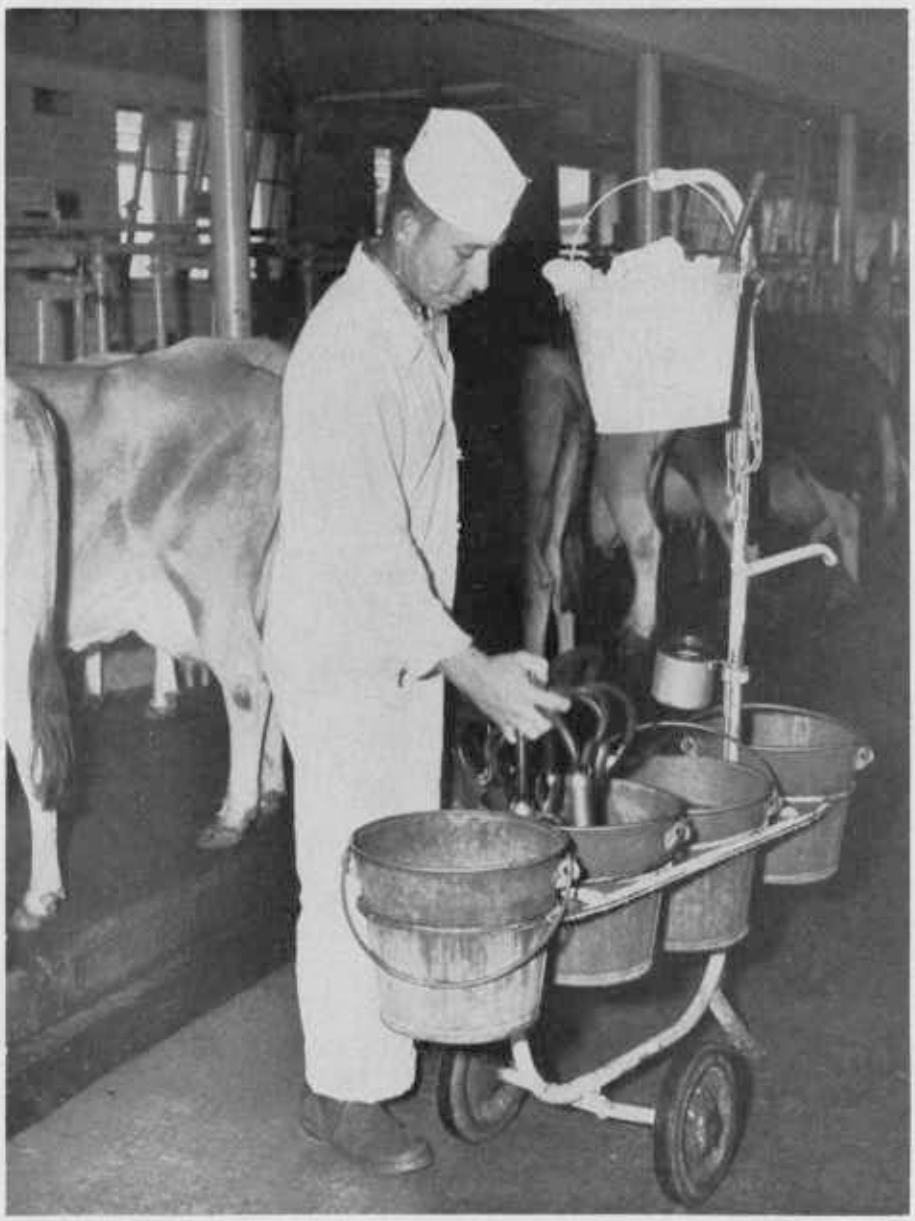
3 **YEARLING WEIGHT** is most important measure of calf's gaining ability. Subtract weaning from yearling weight, divide by number of days.

4 **18-MONTH WEIGHT** is another important selection tool, since it indicates an animal's ability to rustle for feed, and to gain on grass alone.

Chemicals vary in their ability to kill undesirable dairy bacteria. Research bacteriologists at OSC report some guides for . . .

Choosing the Best Dairy Bactericide

HYPOCHLORITES are the recommended bacteria-killers for washing milking machines and pails.



DAIRYMEN FACE a battery of brand names when it comes to buying sanitizing chemicals to keep milk equipment free from harmful bacteria.

These sanitizers (also known as bactericides or sterilizers) vary a lot in their ability to kill undesirable bacteria, and dairymen often don't know which sanitizer works best for a particular job.

Research completed by OSC bacteriologist P. R. Elliker and associates has given some answers to the question: Which bactericide for my dairy?

Generally, hypochlorites are best for sanitizing pails, strainers, cans, tanks, and pipelines. Quaternary ammonium compounds are recommended for washing udders before milking, disinfecting teats after milking, disinfecting teat cups, and disinfecting milkers' hands (see table).

Hypochlorites old standbys

Sodium and calcium hypochlorites have been old standbys for many years. Several have been improved recently by reducing their alkalinity—resulting in higher bacteria-killing action. Calcium hypochlorites sometimes result in excessive mineral precipitation in hard or alkaline waters.

These hypochlorites have several advantages. According to Elliker they are:

¶ Capable of rapidly destroying a wide variety of bacteria, both spore and nonspore forming types. For example, they kill bacteria that survive pasteurization, as well as those causing milk souring, mastitis, and cold-loving[1] types.

¶ Superior to other bactericides in killing bacteriophages (viruses that in turn kill beneficial acid-producing bacteria used in manufacturing buttermilk and cheese).

¶ Equally effective in hard or soft water.

¶ Least expensive of the various dairy bactericides available.

These hypochlorites are not recom-

[1] Cold-loving (psychrophillic) bacteria pose a serious problem to the dairy industry since milk now is held longer on the farm and during transportation and marketing. These bacteria grow rapidly at refrigeration temperatures, and may produce rancid, stale, rotten, or fruity flavors in milk, cream, and other products. Occurring naturally in water and soil, they get into dairy utensils and milk through farm or plant water, unless killed by thorough cleaning and sanitizing. (See *Oregon's Agricultural Progress,* Summer 1954.)

QUATERNARIES are best for disinfecting teats, since they produce less chapping, irritation.

mended for storage of rubber milking machine parts. The active chlorine released from them or other chlorine compounds slowly oxidizes rubber, shortening its life. Dry storage or thorough washing and rinsing, followed by soaking in a lye solution or acid detergent will work.

Chlorines can be combined with cleaners to better cleanse dairy equipment. Researchers at OSC report that adding 25 to 100 parts per million (p.p.m.) of hypochlorite to alkaline cleaners greatly improves their ability to remove milk protein films from dairy equipment. This is especially useful in pipeline milking systems. A number of chlorinated cleaners recently have been marketed. Such cleaners, however, have less bacteria-killing action than straight chlorine sanitizers.

Quaternaries form film

Quaternary ammonium compounds contain some properties that favor their use over other bactericides. Elliker says they:

¶ Form a film on equipment. This film carries a lasting killing effect and is important when certain equipment may remain moist while not in use.

¶ Produce less chapping and irritation of udders and teats, compared to chlorine-type products, especially in cold months. Thus they are recommended for washing udders before milking, and for dipping teat cups, to reduce chances of carrying mastitis from infected to clean cows.

¶ Can be formulated with other detergent-sanitizers that clean equipment and kill bacteria at the same time.

Quaternaries also have some disadvantages:

¶ They kill fewer kinds of bacteria than do hypochlorites. While they are effective against heat-loving bacteria, they are ineffective against cold-loving types.

¶ Their killing power is neutralized by anionic wetting agents which most dairy cleaners contain. If some cleanser material is left on equipment after washing, a quaternary rinse thus has little value. For the same reason, never mix them with cleansers on the farm. They will work as described above when mixed in detergents by manufacturers.

¶ They don't lose their bacteria-killing characteristics as rapidly as hypochlorites when picked up by milk. Milk with measurable amounts of quaternaries is considered adulterated since it contains a foreign chemical. Too much quaternary in milk inhibits acid-producing bacteria used for cultured milks and cheese. Methods have been developed to detect quaternaries in milk.

New chemicals available

Several new chemicals are available, some barely beyond the research phase, One is a new form of household according to the OSC bacteriologist. iodine. It's called an iodophor, and combines iodine with a wetting agent carrier. Iodophors are most active under acid conditions (pH 3.0 to 5.0). When combined with an acid carrier, they rapidly destroy a variety of bacteria such as those causing milk souring, mastitis, plus heat- and cold-loving types. Hard water doesn't lower their killing action, and they don't stain skin or clothes.

Elliker points out that they aren't too effective against bacteriophages. And right now they cost more than the dependable hypochlorites. Until their cost is reduced, there is little chance of replacing dairy sanitizers now in use.

Another newcomer is the chlorine-based, 1, 3-dichloro-5, 5-dimethylhydantoin (Antibac, Dactin). This product has about the same advantages and disadvantages as hypochlorites—but it costs more.

Hot water use limited

Elliker says steam, hot water, and hot air are still in limited use. Heat usually is more expensive and less convenient than chemical sanitizers. Sometimes dairymen use heat to kill bacteria not chemically controlled. This usually indicates utensils weren't cleaned well in the first place, and continued heat may merely cover up a poor cleaning job.

How Best to Use Dairy Bactericides

Application	Bactericide	Concentration in parts per million (p.p.m.)	How to apply
Pails, strainers, cans, milking machines, etc.	Hypochlorite	200	Rinse, soak, or draw through system before use.
Tanks	Hypochlorite	200	Brush or spray before use.
Pipeline system	Hypochlorite	200	Pump or draw through system just before milking.
Washing udders before milking	Quaternary	200-300	Wash with cloth, wring out and wipe off excess solution.
Disinfecting teats after milking	Quaternary	200-300	Dip teats in cup of solution after milking.
Disinfecting teat cups after milking each cow	Quaternary	200-300	Dip in pail of clean water, then in bactericide. Dip two or three times.
Milker's hands	Quaternary	200-300	Dip in solution for few seconds.

Sagebrush may be a blessing in some areas since it does a good job of checking a tougher weed — rabbitbrush.

Go Easy on Sagebrush Removal

DON HYDER, Squaw Butte-Harney range conservationist, checks native grass under dead sagebrush. Grass is important in keeping out rabbitbrush.

SAGEBRUSH is easy to kill—especially with chemical sprays.

But ranchers who kill big sagebrush that doesn't have a good grass understory may ask for even more trouble.

The trouble: rabbitbrush, a hardy range perennial that refuses to die easily. Once competing vegetation is killed, this weed often moves in. Cattle won't eat it, and the range is filled with a much more difficult pest than sage.

The extent of rabbitbrush as a range threat is not completely known, but range researchers W. W. Chilcote and C. E. Poulton report their preliminary findings indicate caution before killing sage.

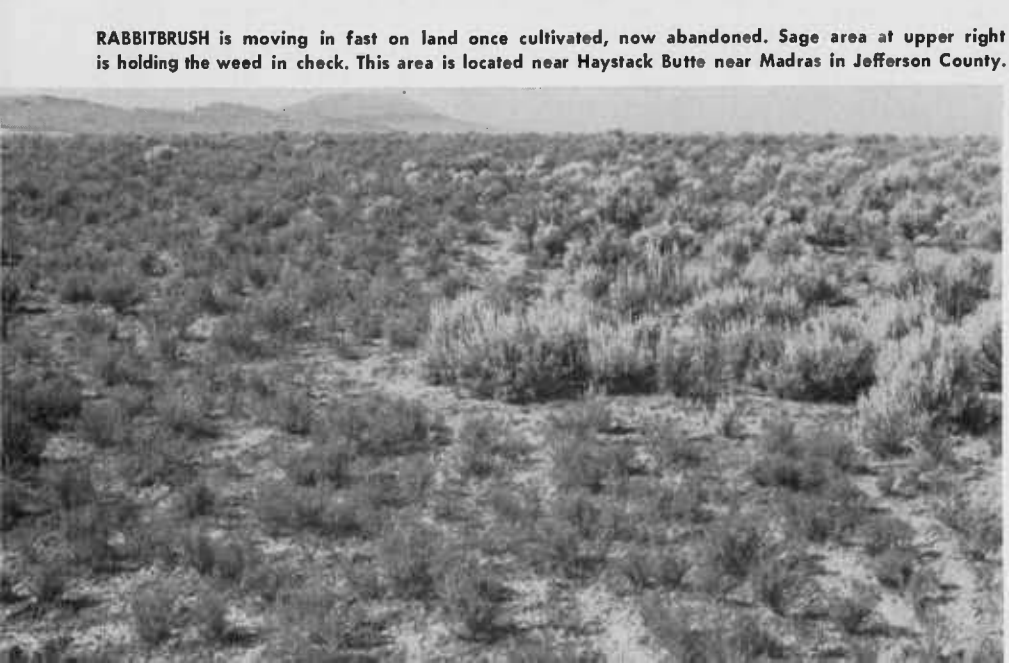
Rabbitbrush is a long-lived (up to 50 years) hardy shrub, native to western ranges. Overgrazing, fire, and cultivation have encouraged its spread until it has now become a major range threat in some parts of eastern Oregon.

Two types of rabbitbrush

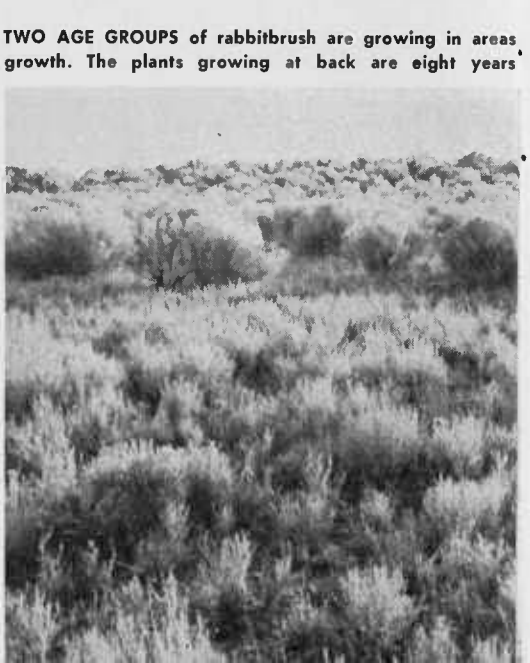
There are two types, gray and green rabbitbrush, and the color difference is the best way to tell them apart. Gray rabbitbrush, however, is often confused with sage. But there's an easy way to separate them: sage leaf tips have two notches, rabbitbrush leaf tips are smooth. Also, sage flowers are gray and not too noticeable, while rabbitbrush is covered with yellow flower clusters.

Rabbitbrush ranges from 1 to 6 feet tall, depending on growing conditions. The weed favors sandy or pumice flats and terraces and rocky outcroppings—where competition from sage and bunchgrass is not so severe. When this natural competition is reduced through grazing, fire, or cultivation, conditions are ripe for rabbitbrush to spread. Abundant windblown seeds produced each year sprout and grow rapidly. For example, Chilcote found plants 1 year old with a root system 4 feet deep, although the top growth was less than 2 inches tall. Once matured, plants may

RABBITBRUSH is moving in fast on land once cultivated, now abandoned. Sage area at upper right is holding the weed in check. This area is located near Haystack Butte near Madras in Jefferson County.



TWO AGE GROUPS of rabbitbrush are growing in areas growth. The plants growing at back are eight years



not spread for several years. After gaining a foothold, they wait until favorable growing conditions, such as lack of competition and a wet summer to encourage a quick spread.

Except on sandy soils and other rocky outcroppings, sage and bunchgrass can whip rabbitbrush if given a chance. Fire and overgrazing give the weed its chance to move in, often permanently. And it has moved in on land that could grow good cattle feed.

Wet years encourage invasion

Age studies in both grass and sage areas show you can expect greater rabbitbrush infestation on rundown ranges after a wet year—especially with rain during June and July. Many of the plants found over a wide area are 14, 7, and 2 years old—showing their establishment was encouraged by the wet summers of 1941, 1948, and 1953. Ranges in good condition were not invaded.

In the native bunchgrass ranges of eastern Oregon, Chilcote found little rabbitbrush growing in areas with a good grass cover. If grass cover is kept and improved, the weed should have little chance of spreading.

In the sage area, a good understory of bunchgrass and sage can keep rabbitbrush in check. Even if the grass is weak, rabbitbrush generally won't move in because of sage's intense competition. Sage is equipped with some good weapons: a deep tap root plus a vigorous shallow root system.

Only few plants a threat

When sage is removed, rabbitbrush becomes a very real threat unless a good understory of grass is there and maintained. Oftentimes, a rundown range faces only a potential threat from rabbitbrush with just a few plants present. Then a buildup of a grass understory is important before sage removal begins.

Direct rabbitbrush control through spraying is not here yet, but may be just around the corner. Workers at the Squaw Butte-Harney branch station near Burns report encouraging results with chemical sprays.

Rabbitbrush invasion of crested wheatgrass is another research problem. The weed gets started the first planting year, but may go unnoticed for 3 to 5 years. Then it suddenly appears and soon dominates the stand. Whether management or a possible spraying program will work has yet to be found, but indications are that heavier seeding, destroying rabbitbrush seed sources, and sowing wheatgrass with other grasses are possibilities.

Right now, good management is the key to rabbitbrush control. For the present Chilcote and Poulton advise:

Don't overgraze the range.

Don't spray sage unless there's a good grass understory.

GRASS prevents rabbitbrush spread. It is safe to kill sage shown in the bottom photo. Note grass understory. Rabbitbrush in foreground of top photo is likely to spread rapidly if sage is removed.

near Madras, indicating effect of wet seasons on weed older than those in foreground. Stake is marked in feet.

Research Briefs

Prevent Baby Pig Crushing • New Key for Measuring Forage Performance • Control Cattle Stomach Worms

Rooting Ability May Reveal Superior Forages

A FORAGE PLANT'S ability to send its roots deep into shale where a permanent water supply usually exists may mean the difference between superior and inferior performance.

At least that was the case for 10-year-old plantings on an OSC hill pasture nursery, report range researchers Val Valassis and D. W. Hedrick.

These workers checked the average root depth down to 4 feet—found most roots in the upper 15 inches of soil.

Woody plant roots go deep

But better varieties also had something else in common: roots had penetrated into rocky shale that's underneath the soil.

Besides checking root systems of improved forage varieties, they also examined the rooting habits of other plants that grow in Willamette Valley foothills. They found bracken fern had the greatest volume of roots in the deeper soil layers, and most roots of woody plants, such as oak and poison oak, were within and growing beyond the shale layer.

Valassis and Hedrick thus concluded that deep-rooted, woody plants do not compete seriously with forages for water. This means you need not completely clear oak woodlands for hill pastures. Just open them up enough so a forage understory can get enough light.

With forage roots of better varieties able to penetrate to a permanent water supply, the workers figure this was the reason extremely dry summers (since 1943) failed to seriously set them back.

Some varieties that stood up well under these dry conditions were Tualatin oatgrass, bent grass, Alta fescue, burnet, and orchard grass.

Perennial, annual grasses compete

Water competition between perennial and annual grasses also was noted—as well as competition for nutrients and light. Where perennials were lush, annuals became dwarfed with small seed heads. With lush annuals, perennials suffered.

Similar competition seemed to exist between deep-rooted perennials and bracken fern. Fern leaves died by the end of July when competing with lush perennials. With little grass competition, fern lived until September.

Tall meadow oatgrass seemed to compete with fern better than all other deep-rooted grasses studied.

Valassis and Hedrick found another interesting fact: the greatest part of the plant is underground. The picture shows that fibrous and highly branching roots about 3½ feet deep resulted in the large top-growth.

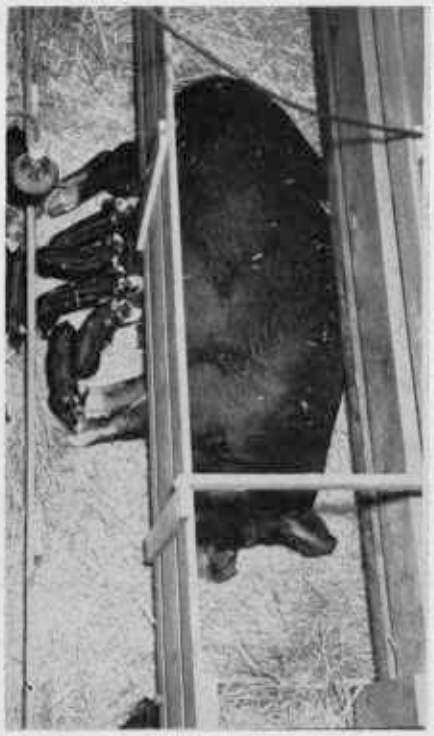
Grazing time important

Also, grazing time was important in building healthy root food reserves. The range researchers report such reserves move from the top of the plant to roots in late spring and early summer. Some protection from grazing thus is needed at least every other year during this period. Forage growth so protected increased, while heavy grazing in late summer and fall, winter, or early spring did not seem to harm plant roots or forage production.

The workers hope further rooting habit studies will give plant scientists a better key to selecting improved varieties under test. Also, studying type, depth, and root system distribution for a given soil will help farmers and research workers better understand the water supplying power of the soil.

RANGE RESEARCHER Don Hedrick points to the four-foot root depth of a Tualitin tall oatgrass plant. Ability of forages to send roots deep like this may indicate superior performance. Top growth at left.

Stall Prevents Baby Pig Crushing



BOTTOM of farrowing stall is open so baby pigs can move about freely. Note the heat lamp.

SOW-CRUSHING of baby pigs is nearly impossible with a portable farrowing stall developed by OSC animal husbandman Tom Johnson.

Testing of the simple device showed no baby pig loss up to 3 weeks after farrowing.

Baby pigs move about freely

The stall is made from two partitions wide enough to confine the sow comfortably, narrow enough to keep her on her underside before she rolls into nursing position. Bottom of the partitions is open so baby pigs can move about freely. Heat lamps suspended in the center of the area outside the "sow" portion warm and attract baby pigs while they are not nursing.

Stalls can easily be adjusted to handle smaller sows or gilts.

Tests indicate sows should be placed in the stall a day or two before farrowing. There's enough room for daily feeding and watering, but 15-minute exercising twice daily is suggested.

Johnson says the first 2 days after birth is the critical period for death from crushing. Sow and litter usually can be removed to a regular farrowing pen after that.

Other advantages cited

Besides stopping deaths from crushing, Johnson cites three other advantages:

1. Less chilling. Small space cuts down drafts between new-born pigs and heat lamps.

2. Less wet bedding. Sow eliminates only in one spot.

3. More handling ease. Cantankerous sows usually settle down quickly and quietly.

Detailed plans and building instructions will be available soon from your County Extension Agent or from the OSC bulletin clerk.

Phenothiazine Good for Treating Cattle Worms

PHENOTHIAZINE proved an effective treatment for stomach worms in beef cattle last year, reports OSC veterinarian Paul Allen.

A trial with 8 infected calves showed 4 treated animals gained 1.7 pounds a day after treatment during the 52-day trial, compared to slightly more than half a pound per day gain for untreated calves.

Allen used 12.5 grams of phenothiazine per 100 pounds of weight (about 6 ounces for 400 to 600 pound calves). Animals were drenched September 24, again October 1, and final weights were taken November 15.

Gained little after mid-July

Test animals were long yearling Hereford steers that had grazed a well-managed, irrigated pasture from April 17 to September 24. They gained little after mid-July, even though pasture was almost knee-high.

Then they were treated, and shifted to dry lot feeding. Animals were fed a full ration of clover hay and chopped barley.

Allen points out that stomach worms are becoming a bigger problem than before because of improved pastures, especially irrigated pastures. Concentrating more cattle on less acreage under conditions that are ideal for worm growth is bound to increase infections.

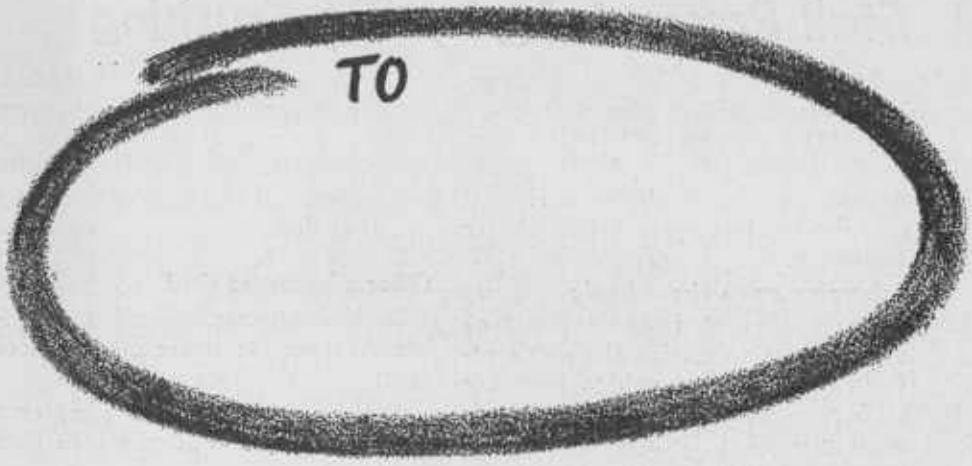
Losses noted several ways

Worm losses take several forms, including poor feed efficiency, loss of grade, lower resistance to other parasites and disease, and death. Such infections can be noted best in weaners and yearlings.

Symptoms include scouring and general unthriftiness. Lightly infected young animals are more difficult to diagnose, but a rough coat and slow gaining are an indication. Frequently, worms can be responsible for a 100 to 150 pound weight loss in a 400 to 500 pound animal.

Any herd not making normal, expected gains can be suspected of parasites. And the only sure way of knowing is having a veterinarian check your cattle.

ROUGH-COATED, slow gaining calves indicate stomach worms may be causing weight loss.



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Farm Outlook

(Continued from page 3)

An early deal on feeders still looks good for the cow-calf man even though ranges and pastures have improved. Recent offers are higher than usual in relation to prospects for fat cattle prices.

Hogs

Hogs will also benefit from the large supplies and lower prices of feed grains. Sow and pig prices probably will be higher than usual in relation to fat hog prices for quite a while. It will take time to get the sows and pigs needed to eat the Northwest grain.

Meanwhile the build-up in hog numbers will be slowed by further slumps in hog prices that seem certain to start soon after mid-summer and continue through next year. Even so, those who learn to do a good job now should make good money from hogs in a couple of years.

The nation's spring pig crop was 9 per cent larger than last year and fall farrowings are expected to be up 11 per cent. This promises a total this year near the 1951 all-time high.

Despite prospects for larger pork supplies, Oregon farmers with barley are in a better position than Midwest farmers with corn as far as hog feeding is concerned.

Poultry

Egg production soon will be falling behind last year. Larger cold storage holdings may slow prices but folks who stayed with the egg business should not be sorry this year. Their hens and pullets should be eating lower-priced feed and laying higher-priced eggs before long. Numbers of chickens on farms are down about one-fifth from last year. The seasonal peak in egg prices may come as late as November this year, in contrast with August last year.

Turkey prospects have been off again, on again this spring. Light breeds have been cut back sharply but a late hatch of heavy breeds may keep the total near last year. With cold storage holdings down, current signs point toward a good market through September and October with some doubt about prices for birds hatched in May and June.

Broilers have blown hot and cold as usual. Placements nationally during the first half of the year totaled about the same as last year but timing was different. This timing is especially important in the broiler business. Today's placings affect the market 10 to 12 weeks from now.

Potatoes

Larger supplies of mid-season and late potatoes are likely to bring lower prices. Careful watch of crop and market reports can make the difference between profits and loss here. Use this information to help you time your digging and selling. Key crop reports will be released July 11, August 10, and September 9.

Fortunately, mid-season potato growers and shippers will again have shipping point market news service in the Malheur County-western Idaho area. This service provides timely information on shipments, arrivals, prices, and conditions at key markets.

Grass & legume seed

Most Oregon seed growers will get favorable seed prices this year, but not as high as last year in most cases.

Bigger crops here and in other countries, a smaller export market, and more imports are some of the reasons prices will be lower. Red and alsike clover, perennial ryegrass, alfalfa, and the turf grasses will be most affected. Prices for alfalfa, red and alsike clover, and perennial ryegrass probably will be lower this year than last year, but higher than two years ago. One thing in favor of good prices for some of the seeds is the smaller carryover this year. The good export market last year helped clean up seed supplies.

Ladino clover, tall fescue, and hairy vetch are still plagued with big government stocks. Prices of these items will not go much above the government selling price. Alta fescue may sell below government prices of 18 to 20 cents.

Crimson clover prices may be higher than last year because of a short crop in this country of both crimson clover and lupine.

Common ryegrass should sell at prices about like a year ago. The crop will be smaller, but the export market will not be as good either.

Most turf grasses are under pressure from big supplies and foreign competition. Merion bluegrass will still sell at relatively high prices because demand is greater than the supply.