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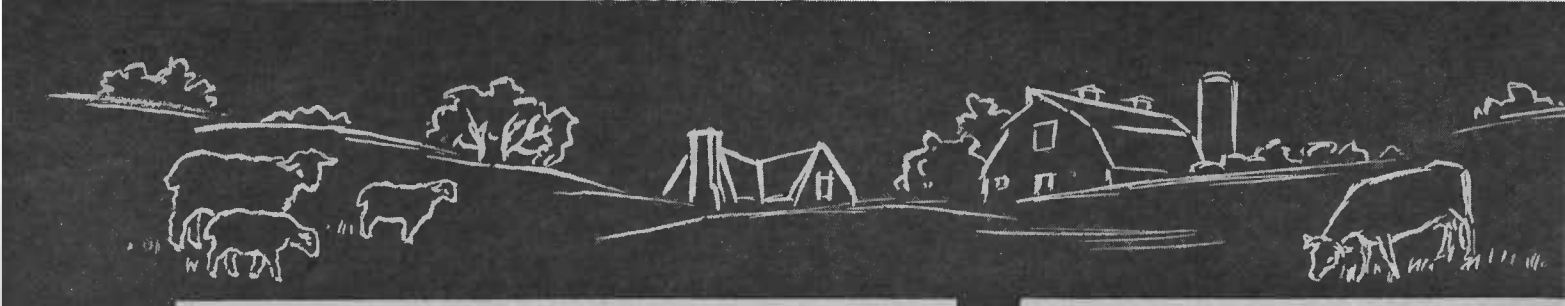
Oregon's Agricultural PROGRESS

Should Farm Land Near Urban Areas Be Preserved? • New Chemicals Control Weeds in Seeds, Grains

OREGON STATE UNIVERSITY CORVALLIS



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Features:

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

COVER: This sheep pasture near a growing Willamette Valley city someday will make choice building sites. But the transition from rural to urban use is sometimes difficult and creates hardships. The problem of urban use of farm land is discussed on page 2.

Photo: Bill Reasons

RECENTLY there has been considerable discussion about the amount of agricultural land that is being put to other uses. Much land that was recently devoted to crop or livestock production is now being used for subdivisions, highways, industrial sites, and outdoor recreational purposes. The city is frequently pictured as a sort of monster, eating up the rural landscape in huge chunks without even pause for digestion. It is doubtful that the present trend has run its course. It is likely that even greater land withdrawals will be made in the future.

Many people are understandably concerned about this trend. No change of this magnitude can occur in our society without some people experiencing painful adjustments. Aside from individual problems, we can ask if the present trend is desirable from a national standpoint. That is, are such withdrawals wise social policy?

Three propositions

Before addressing the above questions there are three propositions that will be advanced. I believe these propositions are correct statements of fact. But they are frequently overlooked in discussions on this subject.

Proposition 1: Cities are efficient users of space compared to small towns, villages, and rural areas. In other words, the larger the city, the greater the density of population. Given the fact that people have to live some place, less space per person is required in cities than elsewhere. That is not to say that cities always make the best use of the land they have or that land use is not a matter of legitimate concern for city planners. It is to say that cities, in terms of the people accommodated per unit of space involved, make more intensive use of land than other types of living patterns.

Proposition 2: There is not now, nor is there likely to develop in the fore-

Should Farm Land Near Urban Areas *Be Preserved?*

By Dr. Emery N. Castle, Professor

Department of Agricultural Economics, Oregon State University

seeable future, a shortage of agricultural land in the United States. It is true, of course, that there is a shortage of food production in the world compared to the number of people who inhabit it. But it is clear that 1) it is physically possible to substantially increase food and fiber production on the land in the United States that is now in agriculture, and 2) there is land not now in agricultural production that could be used in agriculture if the need should arise.

Increase food supply

The studies which have been made on production potential in the United States all point in the same direction—that agricultural production can be increased much more rapidly than population is likely to increase in the United States in the foreseeable future. This does not mean, of course, that we should continue inefficient production techniques or that we should discontinue agricultural research and extension work. Society benefits from these efforts. It does mean that a case *cannot* be made for preserving agricultural land on the grounds of an imminent food shortage.

Proposition 3: Efficient resource use dictates that cities and urban areas should have as much land as is necessary for their proper functioning. The real estate market clearly indicates that urban use is a higher valued use than rural use. It does not make sense to deny an urban area the land that it needs to develop efficiently.

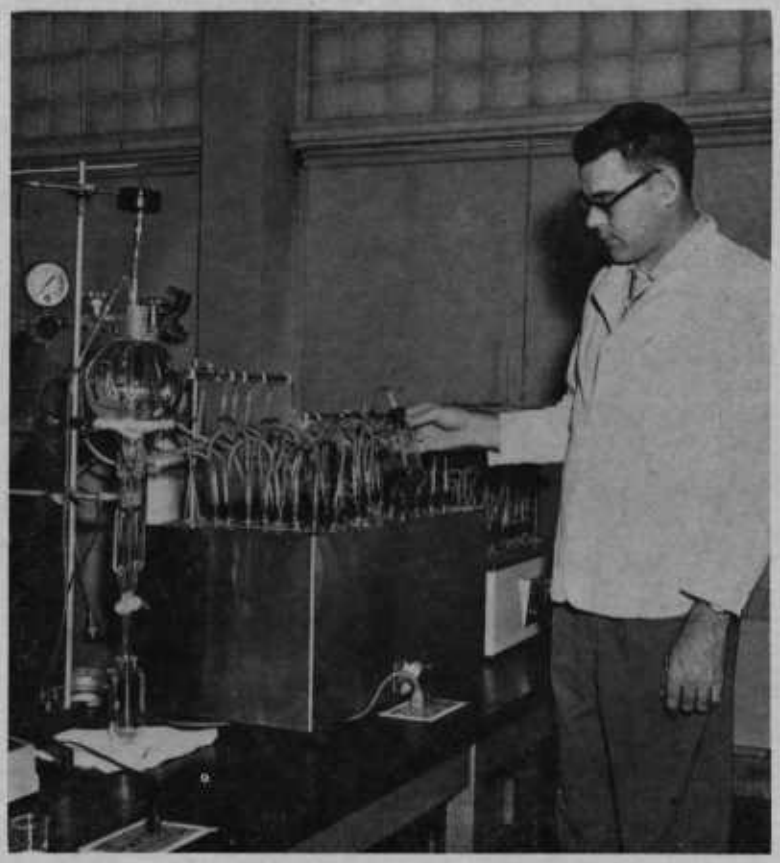
Land use problems

If the above propositions are accepted, it is difficult to justify preserving agricultural land on national grounds as a general policy. There is a temptation, however, to take the next step and say that there is no need for concern—that we should keep "hands off" and let the real estate market and other forces operate as they have in the past. Such a conclusion would be a comforting one, and would eliminate the need for worrying about such things as "greenbelt zoning," highway location, and "skip distances." Unfortunately this solution is too easy. It fails to recognize some very real problems associated with changing the use to which land is put. Let us now turn to a consideration of some of these problems.

We first need to ask if cities are expanding in the most efficient way possible. We said earlier that cities were efficient users of land compared to less densely populated areas. But it does not follow that the city always expands in the best possible way. There are reasons to believe that mistakes are sometimes made.

Cities frequently expand in response to highway location. The automobile has made possible suburban living. "Tongues" of development frequently occur along superhighways. The intersection or cloverleaf is a favorite spot for a shopping center and subdivisions. Instead of the city expanding at an equal rate at all points on an exterior wall, "leap frogging" and "skip distances" frequently occur. The land that is converted to urban use may be excellent agricultural land; if the city had expanded in a different way, less valuable land might have been used. Level, highly productive agricultural land may make for a much less interesting urban development than a rolling hillside that provides sites for daylight basements, curving streets, and natural landscaping. As indicated above, highway loca-

(Continued, page 16)



OSU animal scientist D. C. Church checks liquors fermenting in an artificial rumen. Feed digestibility analyzed.

Ryegrass Screenings Make Good Feed

60% "heavy" common ryegrass screenings provide more digestible nutrients than feeding screenings entirely.

COMMON RYEGRASS screenings fed in combination with alfalfa or corn silage appear promising as a source of inexpensive feed for lambs.

In fact, "heavy" ryegrass screenings that made up as much as 60% of the ration provided more digestible nutrients such as dry matter, organic matter, crude protein, and digestible energy than one would expect by feeding only heavy screenings.

The feeding value of ryegrass screenings was not measured in terms of rate of gain or pounds of feed required for each pound of gain. Rather, feeding value was measured in terms of basic chemical nutrients that were available. Measuring feed value this way gave the research workers—OSU animal nutritionist D. C. Church and research assistant Fred Snyder—not only an evaluation of ryegrass screenings in terms of basic chemical constituents, but also provided them with information for planning efficient feeding trials later.

The chemical constituents measured

are also related to rate of gain and feed efficiency. Thus, relatively high values of dry matter, organic matter, crude protein, and digestible energy can also mean relatively high rates of gain in the feedlot.

The animal husbandmen used two methods for evaluating the nutritional value of ryegrass screenings. One was to chemically analyze feed mixtures containing various levels of ryegrass screenings before they were fed to lambs. Then feces and urine were collected and chemically analyzed. The difference in amount of nutrients before and after feeding was used as the measure for evaluating each feed mixture.

Artificial rumen built

The second method was to build an artificial rumen in the laboratory. Fermentation processes in the lab closely resemble those that occur in a sheep's rumen. In this fashion, the nutritive value of various feed combinations can be analyzed biologically. This method has another advantage: many "blends" containing different amounts of ryegrass screenings can be rapidly analyzed. In this study, blends ranged from 10% to 90% ryegrass screenings. In the digestion trial, only 40% and 60% blends were tested. Another purpose for using this method was to obtain a check on the first method described. There should be (and was) a close association between results.

Results below will describe only the digestion trials (where feed mixtures were fed to lambs). Two types of ryegrass screenings were used—light and heavy. Light screenings consisted of materials such as chaff, stems, and shriveled seeds. Heavy screenings were mostly small and cracked seeds and a few weed seeds. Both types of screenings were fed at two levels—40% and 60% of the ration. In one trial, the remainder of the ration was a $\frac{3}{8}$-inch alfalfa pellet. In a second trial, corn silage was used in combination with screenings.

Experimental digestion stalls were used as one method of analyzing feeds.

Results shown

Results are shown in the figures. Note that nutritional values were the greatest when 60% heavy screenings were used. This was particularly true when fed in combination with alfalfa.

Results using the artificial rumen confirmed these findings. The largest digestion for heavy ryegrass screenings blended with alfalfa occurred between 40% and 60% screenings. For corn silage, the greatest digestion occurred between 60% and 70% screenings.

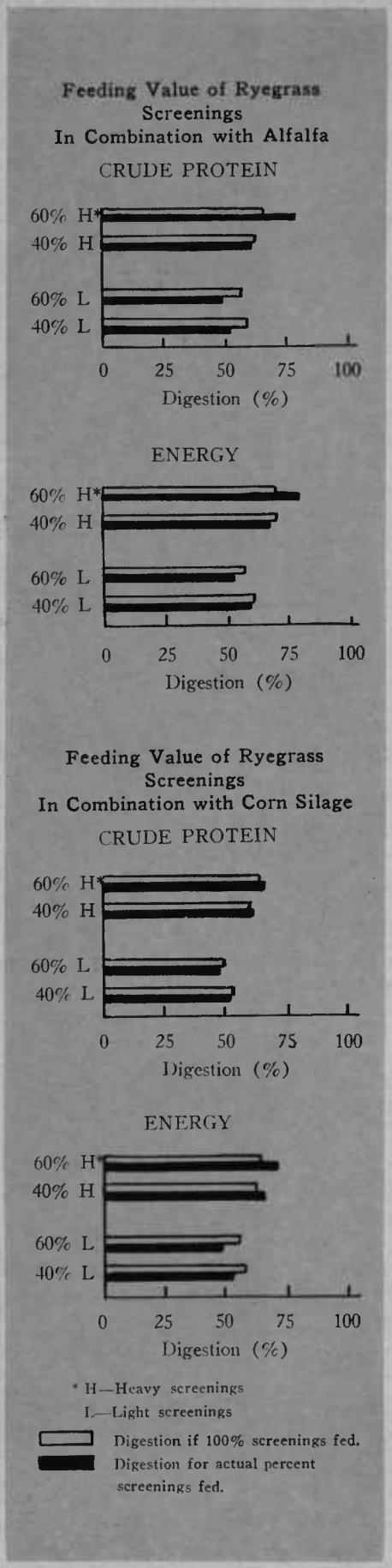
These studies have established that common ryegrass screenings, in combination with other feeds, are digestible and provide nutrients required for growth and maintenance. Whether screenings will be practical in feedlot operations depends partly on the results of feeding trials, but there has been some association between digestion trials and feedlot trials in the past.

Part of the answer also lies in availability and cost of screenings compared to other feeds. Processors have reported that 20% to 25% of the annual ryegrass tonnage is removed as screenings. Prices quoted for straight-run screenings range from $8 to $12 per ton. Smaller processors who sack off heavy and light screenings have valued heavy screenings at $20 to $22 per ton.

Noxious weeds spread

Feeding ryegrass screenings poses another problem. In addition to ryegrass seed, screenings will contain all the weed seeds harvested with the ryegrass crop. These seeds usually include noxious species such as Canada thistle, dock, and sheep sorrel, and many will germinate after hammer mill grinding and animal feeding.

Since grazing animals can spread weed seeds over a farm, it is suggested that animals be confined to prevent spreading of noxious weeds.



Experiments in 1962 were conducted on fields of eight cooperating farmers. Prior cropping included clover, potatoes, and grain. Experiments were designed to measure effects of irrigation, prior cropping on yields and protein content.

When to Fertilize Barley

Two conditions are necessary before nitrogen and phosphorus applications will favorably affect barley yields in Oregon's Klamath Basin area.

NITROGEN AND PHOSPHORUS applications will increase barley yields and affect protein content only under certain conditions in the Klamath Basin, according to a team of OSU research and extension workers.

Two conditions are previous crop and quality of irrigation. Working on the project were Gene Gross, Superintendent, Klamath Experiment Station, and Howard Cushman and W. J.

Jendrzejewski of the OSU Extension Service.

On the basis of one year's work, overall results can be summarized:

If irrigation is both uniform and adequate, barley following either a good stand of legume or potatoes will probably not respond to applications of nitrogen. In most cases there will be enough carryover of nitrogen and phosphorus for barley. However, in some cases where rates of nitrogen on potatoes have been low or excessive irrigations have leached out nitrogen, some response from low nitrogen rates applied to barley has been observed.

Response to nitrogen

Barley following another grain will respond to nitrogen. Phosphorus response will depend on the level of P in the soil, which can be measured by a soil test. Thirty pounds of nitrogen per acre increased yields almost a half ton, as did 40 pounds of phosphorus. An additional 30 pounds of nitrogen increased yields another 500 pounds. Banded phosphorus increased yields by 250 pounds per acre more than broadcast phosphorus where soil test values for P were low.

Excessive (above 30 lbs./A) nitrogen raised the protein content above 12% where barley followed either a legume or potatoes. Where barley followed a grain, protein content was between 10% and 12% for all levels of nitrogen added.

Quality of irrigation affected barley yields, regardless of prior cropping. Where irrigation applications were both uniformly applied and sufficient, yields per acre were nearly a ton higher than where water was either insufficient or not applied uniformly.

Protein content affected

Quality of irrigation also affected protein content. Where water was applied uniformly and was sufficient, protein content remained between 10% and 12%. When water was not sufficient, protein content was either below 10% or above 12%, depending on when a lack of water occurred. If insufficient water was applied early in the season, protein content remained below 10%, particularly if barley followed a grain crop. If insufficient water was applied late in the season, protein content usually was above 12%. The workers explain that sufficient water is needed at all times to use nitrogen efficiently. If water is lacking early in the season, nitrogen will not get into the soil; if it is lacking late in the season, nitrogen already there will tend to "burn" the crop—increasing the protein content. If irrigations are not uniform, protein content will fluctuate widely within a field.

Regardless of prior cropping and quality of irrigation applications, low yields were obtained on saline and alkaline soils. Soils with a pH value of 8.6 produced low barley yields in spite of fertilizer and proper water applications, confirming a fact most farmers already know. Other soils studied had a pH range of 6.3 to 7.9, and responded to both fertilizer and irrigation treatments.

The 1962 trials were established because in the hot summer of 1961 much of the barley crop in Klamath County missed malting quality due to high protein content. Trials from which the above results were obtained were conducted on fields belonging to eight cooperating farmers. Fertilizer dealers cooperated by purchasing irrigation moisture stakes and "reading" the stakes at specific times throughout the season.

Prior cropping listed

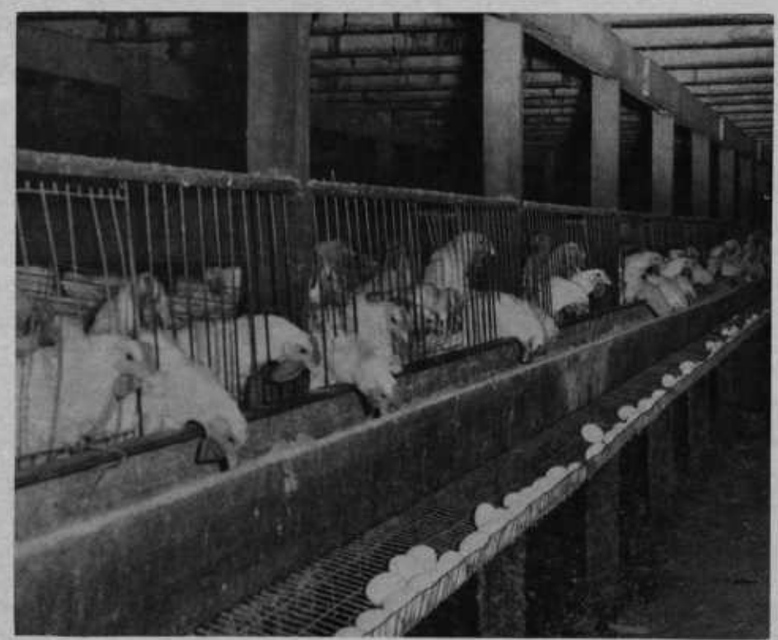
Prior cropping of the eight farms included potatoes, clover, and grain. Fertilizer rates tested were 0, 30, 60, and 90 pounds N/A and sufficient phosphorus to show a response if one was possible—40 pounds per acre. Phosphorus was either banded or broadcast, so that a comparison of type of phosphorus application was possible. One of the side benefits was to calibrate soil test values with phosphorus response. Thus, from knowledge of local soil test values more precise phosphorus recommendations are now available for the area.

Further trials are planned for the 1963 season.

A phosphorus response, left, can be predicted by a soil test. Banded phosphorus can increase barley yields 250 pounds per acre more than broadcast phosphorus.

Barley Can Replace Corn in Ration of Layers

Barley can replace all the corn in most laying rations without reducing egg production.



Barley can replace corn in an all-mash ration without affecting egg production. More feed was needed to produce a dozen eggs.

How much barley does it take to replace corn in a ration for laying hens? How much does type of feeding—all mash vs. mash-scratch—affect feed efficiency (pounds feed per dozen eggs)? Does adding fat to a barley ration affect egg production?

Answers to these and other questions were reported recently by OSU poultryman George Arscott. Groups of White Leghorn hens were fed either corn or barley in combination with or without several additives. Effects of grain source and feed differences were measured in terms of egg production, feed consumption, feed efficiency, gain in body weight, and mortality.

The poultryman found that barley can replace all the corn in either an all mash or mash-scratch ration without reducing egg production. Barley in the ration increased feed consumption and feed needed to produce a dozen eggs, compared to corn, except for birds on a mash-scratch ration. Here, feed required per dozen eggs was higher for barley-fed hens.

Differences consistent

While differences between corn and barley were small, they were consistently in one direction—a lower feed efficiency when barley was fed. In addition, hens fed corn rations were consistently heavier than those fed barley. There was no difference in mortality.

Throughout the experiments, hens on a mash-scratch ration were consistently less efficient than those on an all mash ration regardless of type of grain. This may be because a hen on a mash-scratch ration expends more energy in grinding the whole grains.

Adding 6% fat to the all mash barley ration with an appropriate increase in protein did not affect egg production, improved feed efficiency slightly, and increased body weight. Increasing the fat level to 10% in a mash-scratch ration (which meant 5.7% of the total ration was fat) without adjusting protein level decreased egg production but continued to increase body weight. Again, there was no difference in mortality.

Pellets tested

Pelleting mash rations failed to increase egg production, but feed consumption was increased for both pelleted corn and barley diets. No differences in mortality were found.

Adding an enzyme to barley or corn failed to affect egg production, feed consumption, feed efficiency, body weight gains, or mortality.

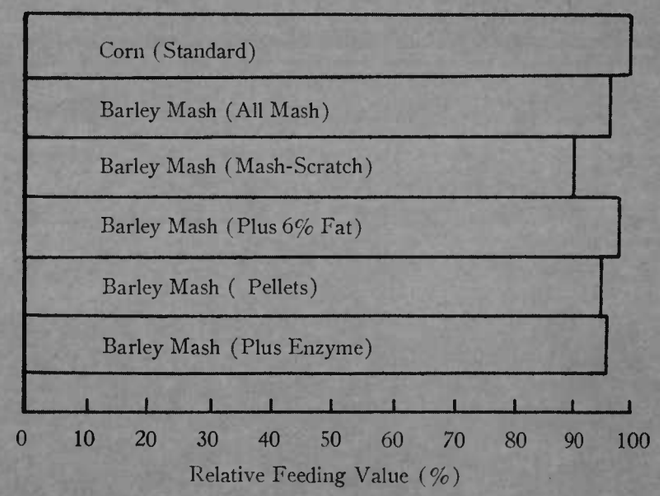
Litter conditions in pens of barley-fed hens were inferior to those fed corn. This was based on the extent of packing and amount of stirring required to loosen the litter.

Arscott also has worked out relative feeding values of barley compared to corn. This will help poultrymen and feed manufacturers determine whether barley or corn is the cheapest source of feed. Recently, barley has been a cheaper grain for layers than corn in most places in Oregon. The price of 100 pounds of corn has been about the same as 115 to 120 pounds of barley.

These relative values are illustrated in the graph. If, for example, you are using an all mash ration, it will require 104 pounds of barley to equal the feeding value of 100 pounds of corn; for a mash-scratch ration, 111 pounds of barley will equal the feeding value of 100 pounds of corn. These values can be computed by dividing the relative value of barley into 100—the value for corn.

These values differ from theoretical energy values. According to theory, barley has an estimated energy value of 81% of corn, regardless of the feeding system employed. These results indicate that barley has greater nutritional worth for White Leghorns than the theory suggests. This means that White Leghorns are able to utilize the energy in barley more efficiently than when barley is compared to corn solely in terms of calorie units.

Feeding Value of Corn and Barley When Fed to White Leghorns



More complete information, including the various rations tested, is included in Technical Bulletin 64, *Barley in Rations for Layers*, by G. H. Arscott, R. J. Rose, and J. E. Parker. It is available from your county Extension agent or the OSU bulletin clerk.

New Chemicals Control Weeds in Seeds, Grains

TWO NEW WEED killers have been harnessed for solving two serious weed problems in Oregon.

The chemicals: Dicamba (Banvel D) and DPA (Dacthal).

The weeds controlled: Sheep sorrel, Canada thistle, cheatgrass, and dodder.

The crops involved: Grass and alfalfa seed, grains.

Treatments using these new chemicals were worked out by OSU agronomists W. E. Lee and W. R. Furtick. Dicamba (Banvel D) has proved to be sure death for sheep sorrel and Canada Thistle, DPA (Dacthal) is highly effective in killing dodder.

Dicamba can kill sheep sorrel with rates as low as ½ pound per acre. Higher rates are needed to completely eradicate this weed, but the low rates will kill nearly all old perennial plants.

Sheep sorrel seriously infests large acreages of grass-seed crops in both eastern and western Oregon. This weed has resisted previous chemical controls. Killing action of the new chemical is similar to that of 2, 4-D.

Delay spraying

For proper application, Lee and Furtick recommend delaying action until fall rains have brought new growth. Research data indicate that sheep sorrel can be controlled with dicamba anytime the weed has leaf growth and temperatures are warm enough for some growth to occur. In western Oregon, this can often be from late November through early spring. Grass-seed crops tend to become more sensitive to the chemical with rapid spring growth. Thus, to reduce crop injury, early spraying is advised—before April 15.

Dicamba controls Canada thistle

Dicamba also shows promise as a weed killer for Canada thistle. Preliminary work indicates that from 2 to 4 pounds of chemical per acre often eradicate this serious perennial. Fall spraying may be most efficient, since it permits use of the chemical after crop harvest. Many crops are sensitive to dicamba, particularly legumes.

Dicamba also is a promising control for downy bromegrass (cheatgrass), a weed which has plagued turf-grass-seed growers in eastern Oregon for many years. Research by Lee has demonstrated that the chemical is effective as a soil herbicide for controlling germinating seed of cheatgrass. It should be applied right after fields have been burned and after the first fall irrigation—within a few days to a week following irrigation. The soil must be moist so the chemical will come in contact with germinating cheatgrass seedlings. Use of 3 pounds of chemical per acre is recommended. Also, a straw chopper or forage harvester should be used to pick up and distribute piles of straw that have accumulated in furrows or in unburned areas. This should be done prior to chemical application.

Registration is expected soon for the use of dicamba at low rates in cereals. Although this material is not expected to replace 2, 4-D, it controls a number of weeds resistant to 2, 4-D. Corn cockle and cow herb have been controlled with rates of ¼ pound of chemical per acre. Knotgrass (or knotweed) has been controlled with ⅛ pound of chemical per acre. Furtick and Arnold Appleby, OSU agronomist at the Pendleton Experiment Station, are testing mixtures of dicamba and 2,4-D to obtain maximum efficiency of both chemicals. The main weakness of dicamba is that it does not control mustard. And the main difficulty of the research so far is to find the best proportion for the two chemicals.

Dacthal controls dodder

The research agronomists report another chemical—dacthal—spells good news for Oregon's growing alfalfa seed industry. This chemical, when applied at 5 pounds active ingredient per acre, provides almost complete control of dodder whose seeds are about the same size and shape as alfalfa seed.

Dodder has been difficult to control. It is a parasite. Plants attach themselves to alfalfa and grow rampant, using the "blood stream" of alfalfa as their source of food and water. Infestations seriously limit alfalfa's ability to produce seed, can even kill a stand.

Dacthal's usefulness may be limited, because it cannot be used on alfalfa where hay may be fed to livestock.

Dicamba controls sheep sorrel, Canada thistle, and cheatgrass in grass seed and grain crops while Dacthal provides almost complete control of dodder in alfalfa seed production.

Photo: Butler Farm Air Co.

Alfalfa easily takes up the chemical, and feeding studies have not been completed to determine its safety to animals. The fact that dacthal is easily absorbed by alfalfa holds the key for one type of dodder control. Furtick found that dodder was receiving the chemical from the alfalfa plant which in turn was taking up the chemical from the soil. Dacthal is harmless to alfalfa, but very toxic to dodder—causing distortion which prevents flowering and may even cause death.

Apply in early spring

But the research workers found that dacthal can also be applied in early spring so that the last rains will fix the chemical in the soil surface. Here, germinating dodder seed will come in contact with the chemical and die—before it has a chance to attach itself to alfalfa. This material can also be applied in sprinkler irrigation, particularly after the first hay cutting has been removed. The agronomists are now trying to work out ways to use dacthal in furrow irrigation.

Alfalfa produced after dacthal application must be burned following seed harvest so that forage will not be used in livestock feeding. Although this chemical is low in toxicity to animals, stringent federal requirements currently prevent chemicals from finding their way into milk. This means that detailed livestock studies will have to determine what happens to the chemical after livestock eat treated hay.

Low Cost Method for Sampling Beans Figured

Green bean quality can vary considerably from field to field. Proper sampling is necessary to determine the true quality for any particular field.

A number of sampling methods will yield the same precision, but some cost more than others.

FOR YEARS, Oregon fruit and vegetable growers have sold their products to processors on a sample basis. That is, processors have determined quality by sampling a small amount of raw product, and have paid the grower for all of his product on the basis of the quality determined from the sample.

But results of different sampling schemes will vary from actual grades for two reasons. One is the amount of natural variability within the product. With large variability, more samples are needed to precisely estimate true quality values. Second is the size and type of sample taken. Usually a larger sample means higher precision. The type of sample is important, because one can often obtain high precision while using a sampling scheme which is less costly than other methods of obtaining the same level of precision.

Probability sampling used

Probability sampling theory developed in mathematical statistics can be useful in evaluating the precision achieved by various methods of sampling as well as for different sizes of samples for each method. This theory was used recently by OSU agricultural economists to determine the most efficient sampling scheme for estimating green bean quality.

The research workers—Bruce Ellis and H. M. Hutchings—tested three sampling methods for their precision (estimate of true quality values) and cost.

Random sampling was employed for all three methods; that is, every bean in a truckload had an equal chance of being selected. The sampling job was to estimate the quality of each truckload. For one sample (let's call it Sample A) two totes were selected at random. Each of the two totes was divided into 10 equal parts, and a 10-pound sub-sample was taken randomly from 2 of the 10 equal parts of each tote. For a second sample (Sample B) two 30-pound sub-samples were taken. Otherwise, the sampling scheme was the same as for Sample A. For a third sample (Sample C) a 60-pound sub-sample was taken continuously from each of two randomly selected totes as the beans passed into the processing line. A total of 38 loads were sampled for Sample A, 53 for Sample B, and 32 for Sample C. A load averaged 9

totes, with each tote averaging 1,000 pounds of beans.

Samples graded

Samples were graded by hand to remove culls, then were sized mechanically so a sample grade could be determined. Variation in raw product grade was then calculated. Based on this variation, the precision of each sampling scheme was evaluated. Sampling cost figures were also estimated.

What were the results when sampling costs also were considered?

High precision must be balanced with costs. Usually, the higher weights per sub-sample within a tote lead to higher precision, but they also lead to higher costs. When precision was held constant, the costs for each sampling scheme varied considerably. Sample A cost $2.14 per load; Sample B, $3.93; and Sample C, $5.38.

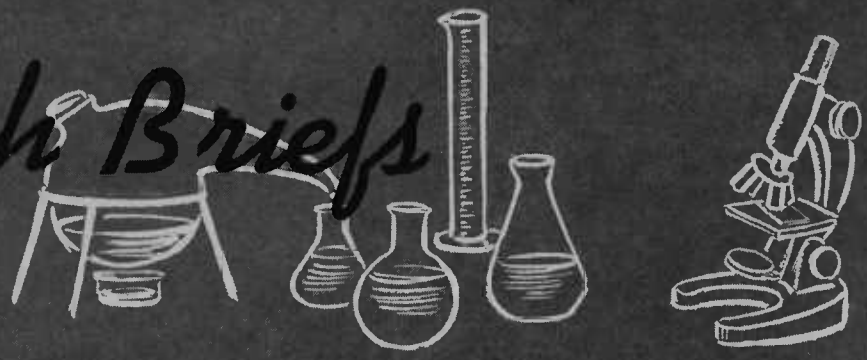
By balancing costs with precision, the economists could also come up with an optimum sampling method within each sampling scheme. That is, one could vary the number of totes sampled within a load as well as the number of sub-samples within each tote. For example, by holding the level of precision constant (estimating within plus or minus $5 per ton of the true value of a load of raw green beans) it would be possible to select the sampling method within each sample scheme that cost the least. For Sample A, this consisted of the random selection of three totes per load with two 10-pound samples per tote. For Sample B, the sampling method was four totes per load with one 30-pound sample per tote. For Sample C, one continuous 60-pound sub-sample each from three totes.

Although sampling costs for the three sampling schemes varied per load, total sampling costs for a season varied even more. Assuming that 15,000,000 pounds of green beans are processed in a season and that an average load contains 9,000 pounds or 9 totes, estimated season's sampling cost for each scheme for the same level of precision was $3,567 for Sample A, $6,551 for Sample B, and $8,968 for Sample C. By selecting the proper method of sampling as well as the size of sample to be used, cost savings can be achieved without sacrificing a loss in precision.

Samples are drawn at the receiving dock before the product enters the plant. Totes and beans within totes are selected randomly to insure an unbiased sample.

Sampling is used not only to determine quality for payment to growers, but also for making in-plant processing decisions which affect the finished product.

Research Briefs



Enation Virus-Resistant Peas To Be Released Soon

NINE YEARS of research to breed pea varieties resistant to pea enation mosaic virus—the most damaging virus disease of peas in the Pacific Northwest—is beginning to pay off, according to OSU horticulturist J. R. Baggett.

Within 3 or 4 years, Baggett predicts, virus-resistant pea varieties will be released for commercial seed production. Working with Baggett have been OSU horticulturist W. A. Frazier and OSU plant pathologists F. W. McWhorter and R. E. Ford.

Peas important

Pea enation mosaic virus causes a 10% average annual loss to farmers in the Pacific Northwest. The disease is carried from year to year in overwintering hosts, possibly vetches, alfalfa, and winter peas, and is transmitted to pea plants in the spring by the pea aphid. The virus stunts and distorts pea plants, reducing yields. Also, misshapen pods fail to shell.

Peas are grown on more than a half million acres in the Pacific Northwest. One-third of the canned and frozen pea pack in the United States is grown in the Northwest—bringing an annual income of approximately $15,000,000 to farmers. Oregon's pea-growing areas are centered around Pendleton, Milton-Freewater, and La Grande.

Even more important, the Pacific Northwest produces 95% of the nation's pea seed. Thus, the entire pea industry depends on the success or failure of the Northwest's pea crop.

Like many other virus diseases, the pea enation mosaic virus cannot be commercially controlled by chemical sprays or other insect-reducing measures. Development of varieties that are genetically resistant to the virus is at present about the only practical solution.

Nine years ago, Baggett began his program to breed such resistant varieties. Corvallis was chosen as the site for the project (even though it is not a pea-growing area) because the incidence of the virus infections around Corvallis is high and numerous perennial hosts are available.

A variety of peas that is naturally resistant to the virus was found growing wild in Iran. Unfortunately, the peas were not good for eating. But these peas were brought to this country by the U. S. Department of Agriculture, and were used as a start for breeding a high quality pea which meets the rigorous standards for processing, yet is virus resistant.

To produce virus-resistant, high quality peas, the wild, virus-resistant pea was crossed with many local high quality varieties. The offspring of these crosses were planted along with susceptible varieties. Since experience over the last 10 years in Corvallis has shown that all susceptible varieties are infected by the virus, this is an efficient method for selecting resistant plants. Those that are not resistant are simply discarded.

Varieties developed

This procedure was carried on for years until varieties were developed that met the necessary production and processing qualities, yet were virus resistant. According to Baggett, OSU has now developed plants which have good processing qualities and strong virus resistance. Once the final purifications and last-minute improvements have been made, seed stocks will be released by OSU to seed companies. After seed companies test the plants and make further improvements, the new varieties will be released commercially.

Breeding materials that have been developed at OSU are also selected for resistance to pea wilt as well as to the enation virus.

Selections of crosses between virus-resistant peas and peas with high quality produced not only peas that were virus resistant but also high in quality.

Flowering is the best time to harvest rye hay. Research has shown that harvesting at this time insures highest protein content and near maximum yields.

Methods for Raising Rye Hay Tested

TIME OF HARVEST, use of nitrogen, and annual or biennial cropping can affect the amount and quality of rye hay raised in eastern Oregon, according to Forrest Sneva, OSU agronomist at the Squaw Butte experiment station.

Sneva points out that there are few common practices among ranchers for raising rye hay. Rye is cropped annually or biennially, seeded in the fall or spring, and harvested at all stages of maturity—from early flower to hard seed. Sometimes these differences are only a fenceline apart.

After five years of research, testing various methods of raising rye hay at the Squaw Butte station, Sneva reports ranchers can increase protein content as well as yields by following a few recommendations . . .

¶ Harvest rye while it is in flower. This insures highest quality and near maximum yields. Delaying harvest three weeks after flowering means a 50% loss in crude protein with only a slight gain in yields. Delaying harvest resulted in losses of crude protein valued at $3.50 to $9 per acre, based on replacement costs.

Nitrogen fails to increase yields

¶ Nitrogen fertilization (up to 60 pounds per acre) did not result in profitable hay increases except in years of high moisture. Here, 15 to 30 pounds of nitrogen per acre applied to favorable locations in the sagebrush-bunchgrass range profitably increased hay yields.

¶ Crop rye hay every two years. You may get slightly higher yields by annual cropping, but the extra yearly costs suggest that biennial cropping is more economical.

Protein content of rye hay dropped sharply in wet years. The level fell below the 7% minimum level for crude protein required for feeding cattle. Crude protein in dry years was well above the 7% minimum. This means ranchers may need to supplement their hay in wet years and consider feeding lower quality roughage in dry years.

In addition, biennially-cropped hay contained higher concentrations of crude protein than did rye cropped annually.

Sneva points out that the crude protein content of hay should be viewed critically. The digestibility of a roughage low in crude protein can be improved by adding small amounts of nitrogen. But to do this, a rancher must know the level of crude protein for his hay. County Extension agents or feed advisers can help in suggesting which supplement will make the most efficient use of hay. Then, a rancher can feed a better quality hay, and, when necessary, stretch his limited hay supply over a longer period of time.

More details will be available soon in a forthcoming experiment station bulletin.

Job Resistance Greater For Part-time Farmers

PART-TIME FARMERS seeking employment off the farm may meet more job resistance in the future than those who leave the farm completely.

That's the report from Keith Jenkins, former research assistant in Agricultural Economics at OSU.

This and other information about off-farm employment opportunities was gathered by interviewing 390 employers in the Portland, Salem, and Eugene-Springfield areas. Employers were classified according to type of industry — construction; manufacturing; services; wholesale and retail trade; transportation and public utilities; finance, insurance, and real estate; and government. In addition, each industry was studied at four employee skill levels—professional-technical, clerical-sales, skilled, and unskilled.

Hiring farmers favored

The economist reports that if other qualifications were equal, at least a third of the employers favored hiring applicants who lived on farms and at least another 60% were neutral. Thus, more than 93% of the employers interviewed either favored hiring people who lived on farms or did not care about their rural background.

But the attitude of employers toward "moonlighting" (holding two jobs) showed that most did not favor this practice, and this attitude does affect part-time farmers because some employers consider "demands of the farm" an undesirable quality of job applicants who live on farms.

"Moonlighting" was most acceptable to employers in government and was disapproved most by employers in finance, insurance, and real-estate.

Employers were also asked if they expected the number of employees in their firm to increase, stay the same, or decrease in the next five years. The economist found that the number of employees in the skilled and professional-technical categories probably will increase their percentage of the labor force in Oregon. Clerical-sales employees will increase in number, but increases will not be as great as those in skilled and professional-technical categories. The number of unskilled workers will increase the least.

"Urban planners need to be aware of some of the rural services that are available. . ."

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tion appears to be a strategic force in such expansion. All public and private costs and benefits should be taken into consideration rather than simply locating highways on the basis of the least-cost route. Highway planners are becoming more aware of this issue and are sponsoring research on the problem.

Preserve farm areas

There may be an advantage to the economic life of the community in preserving certain intensive agricultural areas. Assume that a city expands, withdrawing irrigated land that produces crops for processing. Assume further that other irrigated land is not immediately available for replacement of the processing crops. Because of the withdrawal of land, food processing plants may have to operate at less than capacity with a consequent reduction in employment. If the total costs of the expansion had been borne by the decision makers, expansion in this particular area might have been delayed.

Thus far no mention has been made of the kind of uses that might require agricultural land. There are some nonagricultural developments in Oregon that give reason for concern. It appears there have been rather substantial social and individual losses from mud slides, too many septic tanks in unsuitable soil, and flood damages occurring on known flood plains. These losses can be expected to continue if a policy of complete *laissez faire* is followed.

Rural services available

Urban planners need to be aware of some of the rural services that are available within the Department of Agriculture and in the State Agricultural Extension Service and Agricultural Experiment Stations. The soil survey of the Soil Conservation Service probably has more complete information on the soils of the United States than any other public or private agency. Although their classifications were made for rural land use purposes, it is possible to interpret this information regarding soil suitability for urban uses. Extension services of land-grant universities have people who are aware of this information and who may be of considerable help in urban-rural transition problems. As a matter of fact some state extension services have added specialists to their staffs for just this purpose. Development frequently occurs outside city limits and standards of construction may not be as high as within the city limits. The result may well be a "rurban" slum that will eventually become an urban problem when further expansion of cities occurs.

Windfall profits

We frequently envy the farmer whose agricultural land suddenly acquires great value for urban purposes and who sells out for a handsome windfall gain. Certainly there is no problem here, but unfortunately not all farmers fall in this category. Agricultural land values around a city frequently reflect their possible use for urban purposes. Eventually such a price may be justified, but if all of the land that is affected in this way were offered for sale it is doubtful that buyers could be found. This means there is considerable speculation involved in holding such agricultural land.

Sell and move

Some people have said that the entire Willamette Valley land market has been affected by land speculation for nonagricultural purposes. The farmer who wishes to do such speculation and who is in a position to do it has no particular problem. For the others the best advice is probably to sell and move farther away from the city if high land costs are putting pressure on their income. These higher land costs are reflected mainly in increased taxes and higher interest costs. But, as was mentioned before, if everyone were to sell, land prices might not hold at this level. If this is so, it suggests a particular problem related to the taxation situation for agricultural land. Dr. Grant Blanch discussed this problem in the Winter 1963 issue of *Oregon's Agricultural Progress.*

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