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Type of Forage Affects Worm Loads

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Who Buys Oregon's Christmas Trees?

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COVER: Raising worm-free lambs enabled an OSU parasitologist to find that some pasture forages produce more worm loads in sheep than do other forages. Why this happens is discussed on page 4.

Photo: Bill Reasons

REVENUE is required to finance locally administered community services. Historically, in Oregon, heavy reliance has been placed on the property tax to yield this revenue. The thinking of many farmers in Oregon is that tax levies on property are becoming confiscatory and reliance on this tax must be reduced. The call for relief is not generated by desire to evade community responsibilities. Farmers always have accepted their community obligations and have been willing, as they are now, to pay their fair share of the cost of local government.

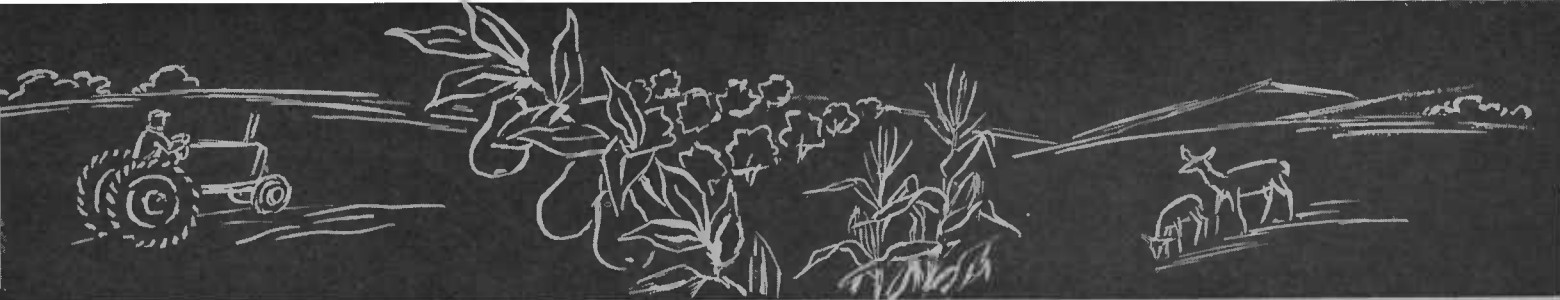
Property ownership basis

In 1844 when taxes on property were levied for the first time in Oregon, and for several decades thereafter, property ownership was a reasonable basis for sharing the cost of local government. Farming engaged a large percentage of the population and practically all income was derived from the land. A high association existed between local property ownership and ability to contribute to government and between property ownership and benefits received.

But is this true in 1962?

Today a large percentage of our population is employed in the professions, manufacturing, and in the service industries. Income is received as salaries, wages, and fees. These incomes to the individual recipients are not directly associated with property ownership, and though the persons receiving them live in local communities and benefit from local services, taxes on these incomes are not collected directly for local needs. Consideration of the question of whether the *ad valorem* tax is still a reasonable basis for distributing the cost of local government for community services is indeed appropriate. (*Ad valorem* means "according to value.")

The property tax fails to meet the



OREGON'S PROPERTY TAX

Is Outdated!

By Dr. Grant E. Blanch, Professor

Department of Agricultural Economics, Oregon State University

test of important criteria of sharing the cost of government services. The generally accepted criteria are: 1) ability to pay, 2) benefits received, and 3) equality of treatment.

No positive relationship

Ability to pay. Today there is no positive relationship between the market value of property held in one's name and ability to pay taxes. Yet, in the final analysis, property taxes must be paid from income—past, present, or mortgaged future.

In Oregon the income flow to farmers has declined in the past 10 years while *ad valorem* taxes assessed to farm property have increased. Compare these indexes for Oregon, derived from U. S. Department of Agriculture and the State Tax Commission reports:

Year	Property Tax	Net Income
1950	100	100
1951	104	114
1952	110	98
1953	111	88
1954	115	78
1955	120	87
1956	125	82
1957	125	71
1958	127	61
1959	136	85
1960	145	77
1961	154	65

Taxes assessed to farm property in Oregon have increased 54% since 1950, while net farm income dropped 35%. The divergence of these trends compounds the adverse economic effects of the property tax on Oregon farmers.

Benefits not associated

Benefits received. As an operative principle, this criterion says it is defensible that the cost of government be borne in some relation to benefits received. Use taxes, such as the gasoline tax for highway construction and maintenance, is of this nature. Property protection and road building are services from which property benefits somewhat directly in accordance to its value. But these are not the primary services rendered now. Elementary and secondary education is the big cost today. Nearly two-thirds of the property tax levy in Oregon in 1961-62 was for school purposes. Therefore, to justify the heavy use of the property tax on the criterion of benefits received, there would have to be a direct relationship between property owned and number of children in elementary and secondary schools. This, of course, does not exist. Education is a general society

benefit and responsibility and is not directly related to property ownership. This cost should be funded at an increasing proportion from some other source or sources.

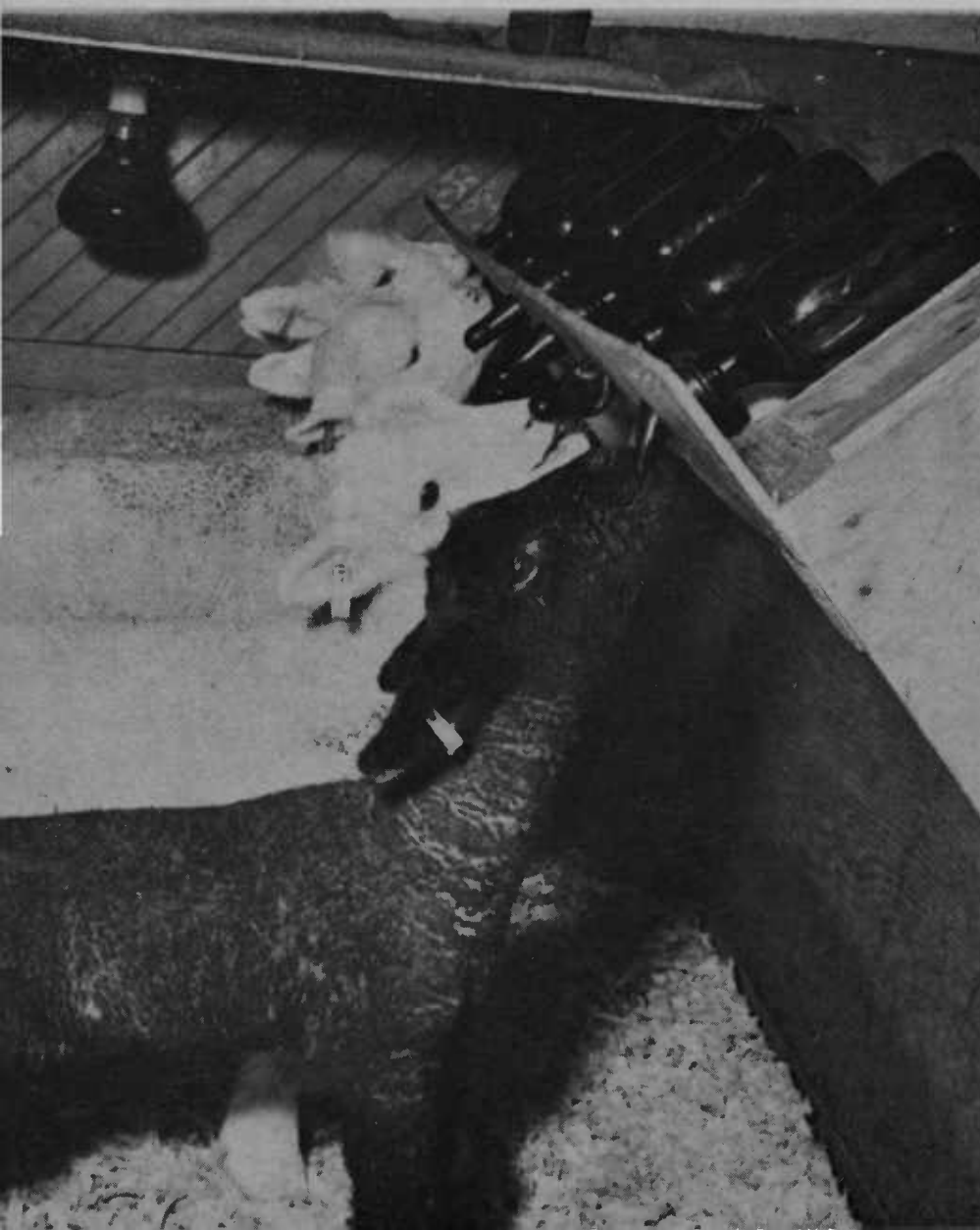
Property not taxed equally

Equality of treatment. This criterion demands that each property taxpayer be treated equally, which means that each should pay the same tax if an identical value base exists when applied to *ad valorem* taxation. The property tax fails this criterion on several counts. Many ruptures have been poked in the fabric of our property tax base through legislative exemptions and special treatment of certain properties and owners. At the present time and in addition to federal and state owned lands and buildings which are automatically exempt from property taxation, it is estimated that property valued at over \$1.3 billion has been granted exemption. When property is exempt or special treatment is accorded, the amount of the taxes the property would have paid must be borne by the nonexempted property as an addition unless the tax levy is reduced.

(Continued, page 16)

Type of Forage Affects Worm Loads

Raising worm-free lambs was one of the first steps in finding if different pasture forages produced different levels of worm numbers in experimental lambs.



Worm-free lambs were pastured on plots that had been infested with the same number of stomach worms. Only difference was type of forage in each plot. Results have led to a basic study of how worms overwinter on these pasture forages.

THE NUMBER of worms in sheep and cattle may be high or low simply from the type of forages used in pastures.

That's the report from OSU parasitologist S. E. Knapp.

Basic research on stomach-worm overwintering led Knapp to study the characteristics of several forages to see why worm counts in sheep were higher when they grazed some forages but not others.

The worm under study was the Eastern stomach worm, or barber's pole worm. Until recently, most research workers thought it did not overwinter in the northern United States. But Knapp demonstrated that it did. The next step was to study more intensively the things that affect overwintering and worm survival.

Few worms kill sheep

The Eastern stomach worm is particularly insidious because it takes only a few to kill sheep. The adult worm lives primarily in the animal's stomach, sucking its blood. This leads to anemia and in severe cases, to death. Only about 6,000 worms are required to kill an animal, compared to the 30,000 to 50,000 of other species. In addition, infected sheep appear in good condition; there is little advance warning that they are infected. Knapp believes these stomach worms are on the increase in Oregon, primarily due to increased use of irrigated pastures.

Proper drenching can control these

—and other—stomach worms. A summary of control experiments appeared in the Fall 1960 issue of *Oregon's Agricultural Progress*.

In his research, Knapp found that the count for infective larvae of the Eastern stomach worm was lowest for ryegrass, highest for New Zealand white clover and subterranean clover. (Infective larvae are the mid-stage in the life cycle of this worm. Eggs are excreted in the feces. These eggs hatch, and microscopic size larvae crawl from the feces or soil surface to plants, then up the plants. When sheep graze, infective larvae on the forage may reach the stomach and develop into adult worms. Worms can overwinter either as eggs or as nonfeeding larvae. An egg-to-egg cycle takes about 28 days during warm, moist summer weather.)

Exact worm counts for the past two years are shown in Figure 1.

Lambs worm-free

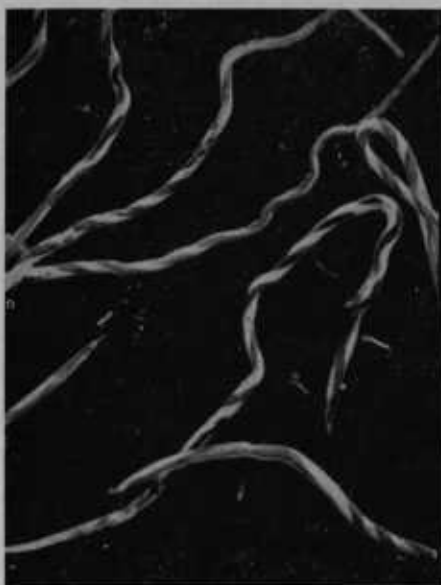
These studies were based on worm-free lambs grazing on specially-sown, worm-free forage plots. In December, each plot was infested with the same number of worm larvae. The same worm-free sheep were allowed to graze only the same forage plot 7 hours daily for 18 days in early May. Egg counts were made of feces in June, and total worm counts were completed after lambs were slaughtered in July.

Why should worm loads be low on ryegrass, high on sub and white clover? Knapp believes humidity or amount of moisture on the plant is important. To test this he placed 1,000 larvae at the base of several ryegrass and sub clover plants. Ryegrass and sub clover plants were grown under two conditions—high (greater than 90%) and low (less than 30%) humidity. Each day, two ryegrass and sub clover plants were cut from each level of humidity, divided into sections, and analyzed for larvae. Results are shown in Figure 2.

Few larvae recovered

Note that few, if any, larvae were recovered in low humidity conditions; all the larvae remained in the soil at the base of the plant where Knapp had left them. With high humidity, larvae migrated up the stems and onto the leaves—but more so for subclover than for ryegrass.

Microscopic inspection of this move-



Eastern stomach worm causes anemia, death in Oregon sheep and cattle.

ment suggested an explanation. Ryegrass leaves are ribbed with parallel veins with spaces large enough to harbor larvae. But, possibly more important, Knapp noted that at certain times water droplets were present on ryegrass leaves. Larvae were observed in these "dew" drops, migrating toward the leaf tip. For sub clover, no water drops were noted, and only a few larvae were observed migrating. Most remained in a tightly coiled, dormant-like condition on plant stems and leaves.

Larvae migrate

What might be happening is that worm larvae on ryegrass migrate rapidly—aided by dew drops—to the leaf tip and fall to the ground. There the larvae must crawl back up the plant where the process possibly is again repeated. But larvae are limited in the amount of energy they have. They eat at only two stages of their life cycle; soon after they hatch (when they probably feed on soil bacteria) and as pre-adult worms (when they feed in the sheep's stomach). As infectious, migrating larvae, they do not feed. Thus, the researcher reasons that larval numbers are reduced because they die from lack of energy or lose their ability to develop into adult worms after being eaten by sheep. For the sub clover plants—where such active migration was not observed—

more larvae remain on the plant and are likely to develop into adult worms after being eaten. With low humidity, migration apparently was slowed or stopped on both plant species.

Sheep can become infected

This may explain why worm loads were lower for lambs grazing ryegrass plots, compared to New Zealand white clover and sub clover plots. But this does not mean that sheep grazing ryegrass pastures cannot become infected. In fact, there is a good chance they will become infected when the humidity is high—such as this past fall.

All this does not mean that white clover and other legumes should not be used in pasture mixtures. It does mean that chances for worm infection are higher, and that drenching and other worm controls become more important.

FIGURE 1.
Forage Affects Worm Count

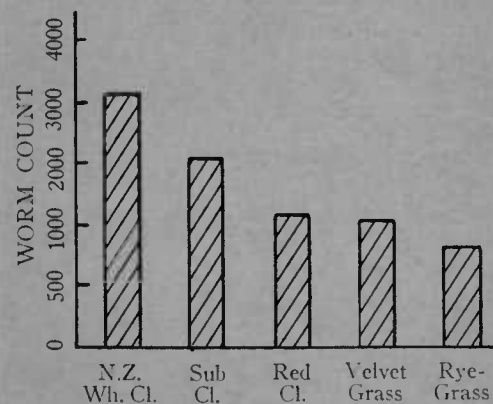
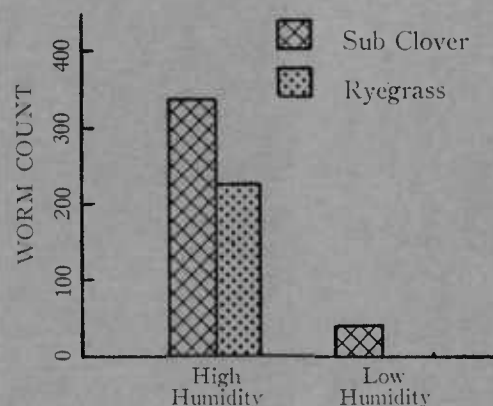


FIGURE 2.
Humidity Affects Worm Recovery



Who Buys Oregon's Christmas Trees?

CHRISTMAS shopping often includes buying a tree. And within each price range, preferences vary from tall, slender, short-needed trees to short, full, long-needed ones. Preferences also include time of purchase—soon after Thanksgiving until a day or two before Christmas.

This variation in preference and buying habits has important implications for Oregon Christmas tree growers. The nature of the west coast market for Christmas trees was evaluated in 1960 by OSU agricultural economist M. J. Conklin.

Conklin surveyed families in the four largest population areas on the west coast: Seattle-Tacoma, Portland-Eugene, San Francisco Bay, and Los Angeles. The survey was conducted immediately after Christmas in 1960.

Christmas trees big business

Christmas trees have become big business. In 1959 production in the Pacific Northwest totaled more than 3½ million trees. Of these, three-fourths were grown in Washington, one-fourth in Oregon. Almost all produced were sold in Washington, Oregon, and California. Of the trees produced in Oregon, 41% were sold in the state, the rest in California.

Some of the questions Conklin asked residents were: if they had a Christmas tree, where they had obtained their tree, when they bought it, size and type of tree they preferred, and, finally, how much they paid for it?

Results revealed an interesting program of tastes and preferences . . .

Four out of five families in the Washington and Oregon cities had trees, while only two out of three had trees in the two California areas. Artificial trees were most popular in Los Angeles—representing 13% of the west coast market. They were least popular in Seattle-Tacoma—representing only 4% of the market.

Those who did not have a tree were primarily single persons or older couples living “alone” who spent Christmas with their families. Other reasons included religion, expense, and too busy.

Most people purchased a tree rather than cutting one. Temporary lots provided 40% of the trees in Seattle-Tacoma, 45% in Portland-Eugene, 56% in San Francisco, and 45% in Los Angeles. Other major sources were supermarkets, florists, garden shops, and variety and department stores.

Time of purchase varied

Time of purchase also varied. Christmas 1960 was on a Sunday. Most families purchased their trees the weekend prior to Christmas. Only a few bought trees the second weekend before Christmas. Californians, in general, tended to buy their trees earlier than those in Washington or Oregon. When Christmas falls in midweek, sales tend to spread over the two weekends be-

fore Christmas. Fair sales are reported for the period between. Conklin points out that time of purchase is particularly important for tree distribution. Keeping trees fresh can be a problem, especially in warm weather. He found a need for merchandising in which retailers set up their early display with a limited number of trees, then replenish with fresh trees throughout the selling season.

Dense, full trees preferred

Given a choice, 80 to 90% of people in all areas prefer a fairly dense, full tree. This preference does not mean they will buy such a tree if it means higher cost.

Most buyers could not identify tree species unless they had paid a premium price for a specific kind. They only knew whether their tree had long or short needles. Actually, Douglas-fir was purchased by 76% in Seattle-Tacoma, 86% of the families in Portland-Eugene, 36% in San Francisco, and 54% in Los Angeles. Other popular trees were pine (except in Portland-Eugene), red and white fir, and other short-needed trees.

Size of tree bought ranged from 1 to 11 feet, averaging about 5 feet in San Francisco and 5½ feet elsewhere. Less than 4% of buyers in all areas had trees over 8 feet tall.

Prices paid for green trees in the four areas can only be approximated, since prices also varied with species,



The market for Oregon-grown trees varies by type and size of tree preferred, time of purchase, and by prices paid. Buyers were surveyed in Seattle, Portland, San Francisco, and Los Angeles.

size, quality, and type of retail outlet. In general, prices per tree averaged \$2.11 in Seattle-Tacoma, \$3.37 in Portland-Eugene, \$4.83 in San Francisco, and \$5.90 in Los Angeles.

Flocked trees were found in 1 in 16 homes in Seattle-Tacoma, 1 in 11 homes in Portland-Eugene, 1 in 7 in San Francisco, and 1 in 9 in Los Angeles. Prices for flocked trees ranged from essentially the same as for green trees in Seattle-Tacoma to about \$3.42 higher than green trees in Los Angeles.

More cultivated trees

The proportion of cultivated trees reaching markets is becoming larger each year. Use of Douglas-fir appears to be increasing, due primarily to an improvement in quality and a relatively moderate price. Pine also appears to be growing in popularity as more people are becoming familiar with it.

Conklin emphasizes that quality is the key to continued or increased demand. By quality, he means the shape, fullness, and freshness of the tree. Since it costs just as much to handle, ship, and sell low quality trees as high quality ones, he reports there will be greater chances for profit as well as satisfaction of the buying public if only high quality trees are raised and marketed.

Additional details are reported in a publication from OSU's Department of Agricultural Economics.



Even very weak newborn pigs will nurse from a bottle. A little milk fed early will remarkably strengthen weak pigs, enable them to nurse, avoid crushing.

Farrowing crates with heat lamps prevent crushing and provide needed heat for baby pigs. Attendance at farrowing will save both strong and weak pigs.



RUNTY BABY PIGS can—and should—be saved.

Dead baby pigs cost money. And their cost must be spread to those that survive, according to OSU animal husbandman D. C. England. Cost per pig weaned decreases directly with the increased number of pigs weaned. Data from a midwest experiment station indicate that doubling the number of pigs weaned per litter from 6 to 12 cut cost per pig by half.

Research at OSU and elsewhere has shown that pigs low in birth weight are not likely to survive. Only 32% of the pigs weighing two pounds or less at birth survived, compared to 82% of those weighing four or more pounds.

Two Ways to Save Runty Baby Pigs

More than 90% of OSU's runty baby pigs have been saved by following two simple rules.

England says most baby pig deaths are caused by any one or a combination of crushing, scouring, chilling, and starvation. Use of farrowing crates prevents most crushing at farrowing. Properly constructed guard rails and protected areas with heat lamps eliminate most crushing later. Scouring may be due to many causes, but does not occur in pigs of low birth weight any more than pigs of heavier birth weights.

Two causes for death

This leaves chilling and starvation as two main causes for death of runty baby pigs. Research at OSU has been aimed at finding whether or not artificial feeding and additional heat could

prevent baby pig death losses.

In 1961, 90 spring-farrowed pigs were caught in plastic bags at birth and removed immediately to laboratory rooms where room temperature was above 70° F. Heat lamps also were provided over areas where the pigs were kept. The closed room was free of drafts. Pigs were fed individually by bottle and nipple during the first five days. Only one pig died.

The research workers report that pigs of low birth weight consumed less milk than heavier pigs—even under conditions free of competition. They observed that pigs low in birth weight nursed less rapidly and with less force than larger pigs, indicating that they encounter greater risk of

starvation than do larger pigs. This risk, combined with greater heat loss (a larger proportion of a small pig is made up of body surface, compared to a heavier pig), explains why pigs of low birth weight are more likely to die from starvation and chilling than larger pigs.

Idea tested

England tested his idea that smaller baby pigs could be saved by preventing starvation and chilling. In the summer of 1962, 92 pigs were farrowed. Heat lamps were provided in farrowing pens. Pigs were treated for scouring, and weak-looking pigs were supplemented with a bottle. All 92 pigs survived and grew normally.

From these experiments and experience, the animal husbandman reports:

¶ The two main causes of higher death loss of smaller pigs at birth are lack of warm enough temperature and lack of adequate food. These losses can be prevented by the swine producer. Temperature can be increased by using covered brooders with heat lamps. Additional food can be supplemented by feeding the pigs a sow milk replacer (or cow's milk with a whole egg mixed in each quart). Leave weak pigs with the sow and feed several times daily, using a bottle with a lamb-type nipple.

¶ OSU experiments using the above method are still in progress. Of 302 pigs farrowed, 42 were "runts." Only 8 of the 302 have died. Four normal size pigs were crushed; three died the second day; and one died when 6 days old. Thus, 91% of the "runts" survived with nothing more added to the usual conditions than warmth and food.

Injuries may interfere with nursing and are sources of infection. These injuries, plus scouring in pigs, uterine infections, mastitis, and lack of milk in sows must be treated promptly.



When moved from farrowing crate, hover with heat lamp, such as simple structure below, prevents drafts, provides warmth especially necessary for small pigs.



Predicting the We

Foresters need more than just general knowledge about the weather, and

WEATHER is important to foresters, but foresters ask different questions about the weather than do farmers or most other people.

Weather has much to do with the ways of a natural forest, even more with the ways man uses the forest, according to OSU forest meteorologist W. P. Lowry. Depending on the weather in a particular season or year, mature trees grow well or poorly, and produce a good crop of cones or do not; populations of destructive insects, disease-producing organisms, and animal pests increase or do not; and seedling trees are or are not able to establish themselves and compete successfully with other plants. Depending again on the weather, forest lands may dry out and become highly flammable when pressures for recreational use of these lands increase.

Effects understood

Many of these general weather effects are understood to some degree, but forest managers often need more than just broad knowledge. They need detailed scientific information on the ways weather and climate affect natural processes in the forest.

Research foresters in Oregon became acutely aware of weather effects through their work on two problems of forest protection: the life cycle of the destructive spruce budworm and initiating forest closure during dangerously dry weather.

The insects developed at different rates and times in various areas of the Blue Mountains. Clearly, this was a result of differences in weather between areas.

With forest closure in the Coast Range, one logging operator might complain that the shut-down curtailed

work and payrolls when conditions were still "dripping wet," while another operator, from just over the ridge, would say he had been surprised the closure hadn't been made sooner—conditions in his area had been like a tinder-box for days.

The first step in solving these riddles was a series of special weather observations during three summers in the Coast Range near Falls City. Lowry and Alan Berg, research silviculturist, gathered data at stations located at various elevations on the slopes of Bald Mountain. Results revealed that the atmosphere sometimes was stratified over the area and at other times was uniformly mixed, depending on the particular type of weather pattern covering the Pacific Northwest.

If the layers of air were well-mixed, correcting for elevation and finding temperature and humidity at any level was easy, once you had the information at one level. On other days, however, there might be a layer of warm, dry air lying above a layer of cool, moist air—the lower layer filling the valley bottoms and covering the lower slopes. Occasionally there would be three layers of air, one above another. At other times one layer would cover the west slopes, another the east, and a third lie above both, only the mountain peaks protruding into the upper layer.

No wonder observations at ground level presented a puzzled patchwork!

Not complicated

Lowry points out that the situation is not nearly so complicated as it might seem at first. Two or three of the layered patterns accounted for weather in almost all of the days of the summer forest fire season. In another way, things were more complicated. For-

esters had to learn to recognize which atmospheric pattern lay over the mountains on a given day without the aid of the special observations of the field study. With only regular weather maps and observations to work with, the scientists are gaining confidence in recognizing the structure of the atmosphere in the mountains with only scattered observations to go on.

Another way to study weather

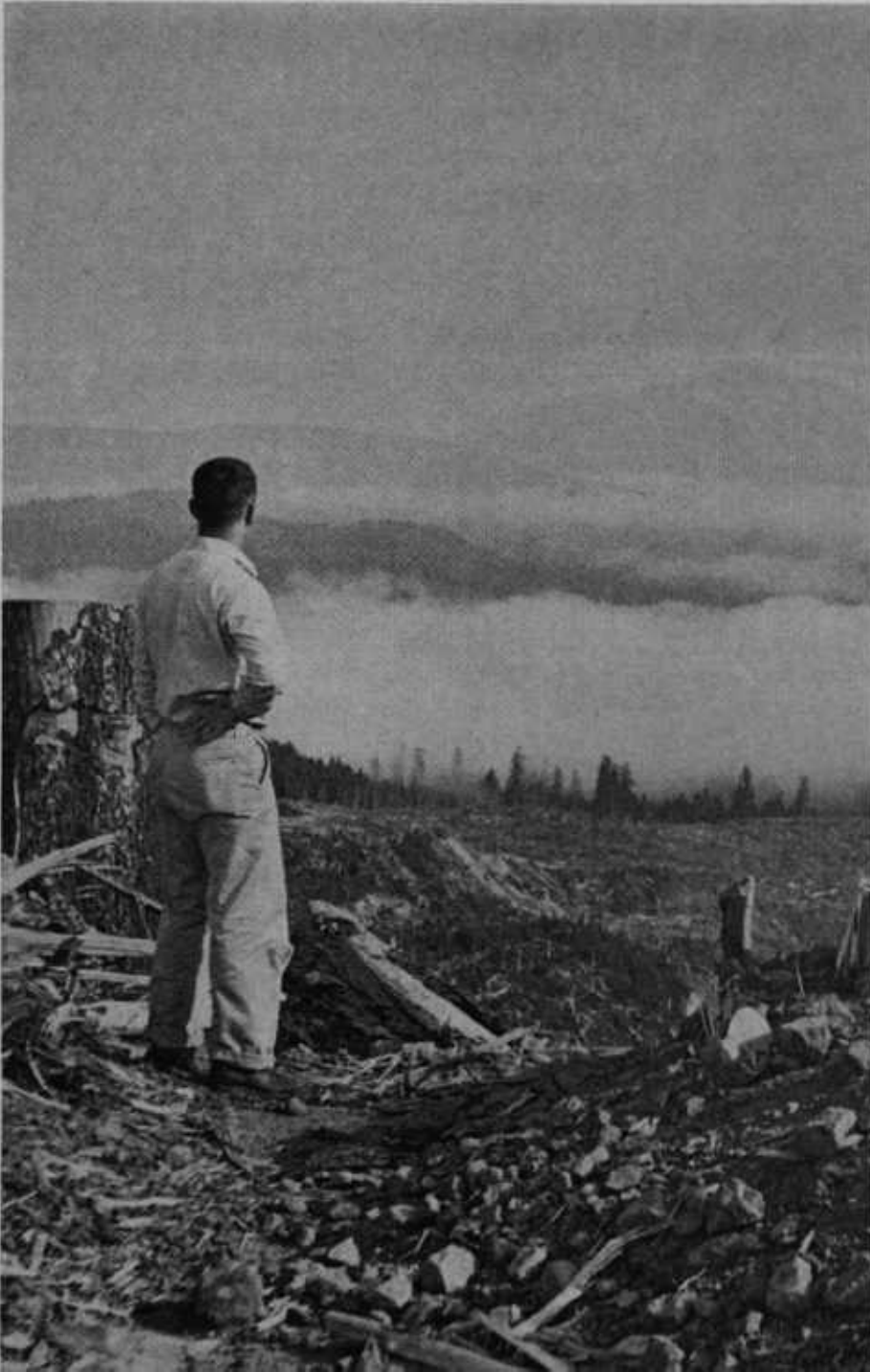
This is but one way studying weather has helped foresters. Another way is by examining historical weather records. At OSU, Lowry has been working on three kinds of studies. The first involves estimating the probabilities of certain weather variables being observed at the various weather stations in Oregon. A typical question to be answered by this kind of study is, "On how many days will it rain or snow during the middle third of April?" The answer for an average year at Medford is about 4 days out of 10. For Salem and for Tillamook, the answer would be 6 and for Pendleton 4. Another typical question concerning these probabilities might be, "On how many days will the temperature be above 90 degrees near the end of July?" The answer for an average year in Roseburg is about 1 day in every 4. The answer for North Bend is zero, for Oakridge 1 in 3, and for Ontario 8 days in 10.

The second kind of study involves the occurrence of certain weather variables not just at a single place, but simultaneously over an area. A typical question to be answered here is, "On a cold night in the Willamette Valley, which areas may expect to have temperatures fall below freezing?" The answer to this question is the subject

Weather for Foresters

researchers at OSU are attempting to provide some necessary answers.

Fog in the Valsetz basin is beginning to lift in the early morning hours. Such weather often produces unique patterns of temperature, humidity in the area.



of current research at the Forest Research Laboratory, and it is easy to see that this is a much more difficult question to answer than those in the first type of study. Depending on the kind of overall weather situation, the freezing zone may cover the entire northwest portion of Oregon, it may appear only in the floor of the valley and part way up the slopes, or it may be restricted to the northern portion of the valley.

Study various weather patterns

The last type of study is concerned with sequences and durations of various weather patterns over the state. An illustrative set of questions to be answered under this study would be "What are the typical patterns of atmospheric pressure and windflow during midsummer? In what proportions do these patterns usually occur? In what sequences do they occur, and to what set of patterns do they give way at the end of summer?" Not only is this set of questions more difficult to answer than the others, but also the answers would be useful primarily to the meteorologist, rather than to the forester.

Answers to some of the questions posed are already known by individual foresters and farmers as a result of long experience and careful observations in a particular locality. But the answers are almost "private property" and are not written down anywhere. Other answers have been found and are available as reports from the Forest Research Laboratory at OSU. (Write for: *Studies of Oregon's Climate for the Forest Industry*—Oregon State University, Box 571, Corvallis, Oregon.) Still other questions are being answered by current research.

Rust Control for Grass Seed Crops

A COMBINATION of two fungicides provides almost complete control of three common rusts that attack bluegrass, according to John Hardison, U. S. Department of Agriculture plant pathologist stationed at Oregon State University.

The rusts: Stripe, leaf, and stem rusts—common fungi that attack many grasses in Oregon.

The control: Nickel sulfate combined with maneb. Rates and times of application are described below.

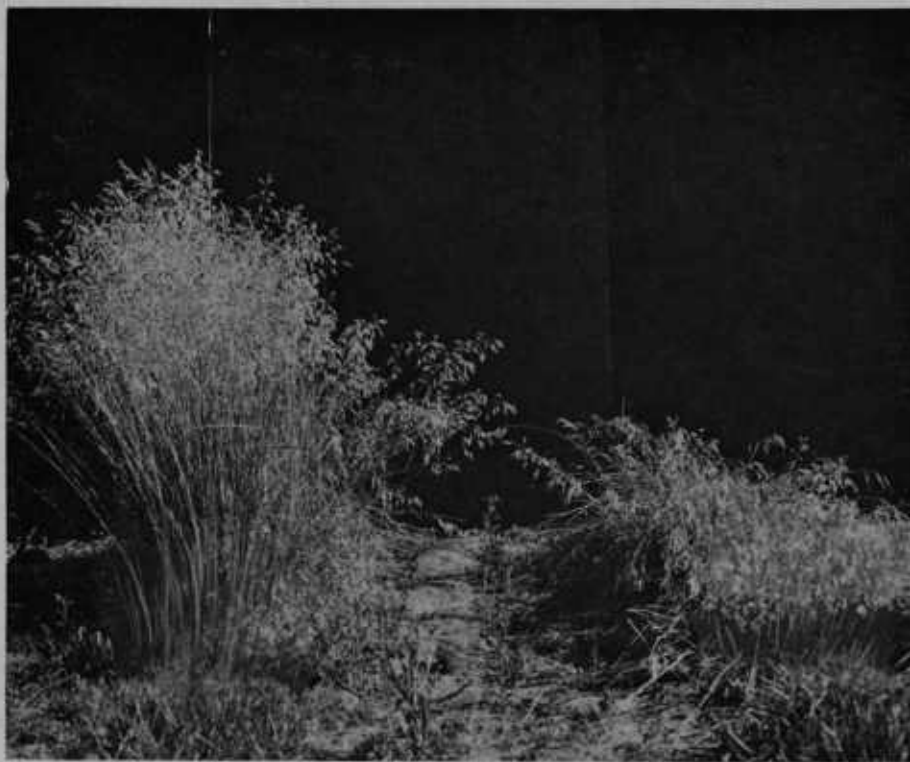
The significance: For the first time grass seed growers can control outbreaks of stripe, leaf, and stem rusts and possibly many other rusts with an inexpensive, effective fungicide combination. While research to date has been with bluegrass, the future promises similar control for other grass seed crops.

Research began in 1958

Hardison's work on a control began after stripe rust first appeared on bluegrass in Oregon in 1958. Outbreaks destroyed from 75 to 100% of the seed crop in several Merion bluegrass fields during 1959. The usual control methods (burning stubble in fall, etc.) plus protectant chemicals designed to control leaf rust failed to provide satisfactory control for stripe rust.

In 1958-59 Hardison screened a number of possible fungicides in the greenhouse and on field plots. Dramatic, short-term control of rust infections was noted for compounds containing nickel. A few field trials confirmed that several applications of nickel in combination with one of several fungicides could economically control these rusts.

In 1960 tests were completed that demonstrated nickel sulfate was the



Bluegrass stems weakened by stem rust, right, collapse from wind. Treated bluegrass showed no rust damage, produced a seed crop.

For the first time, bluegrass seed growers as well as growers of other grass seed crops may be able to control more than 125 rusts. Inexpensive control obtained by nickel sprays can replace several costly protective applications. Thus, production of many rust-susceptible grasses can be continued in Oregon.

best form of nickel to use, and that maneb was the best of several fungicides to use in combination with nickel sulfate. Again, excellent control of leaf, stem, and stripe rusts was obtained in both field and small-plot trials with two to four applications.

In 1961 minimum rates for effective control were determined for both fungicides. The plant pathologist reported that 1 to 1½ pounds per acre of nickel sulfate hexahydrate with 2 pounds of maneb per acre applied three times during the spring gave maximum control for minimum amounts of fungicide. The dates of application were April 20-25, May 10-15, and May 21-30. Near-perfect commercial control of stripe and leaf rusts was obtained with this combination. Good initial protection is needed about May 1-10, when bluegrass becomes very susceptible to rust infection.

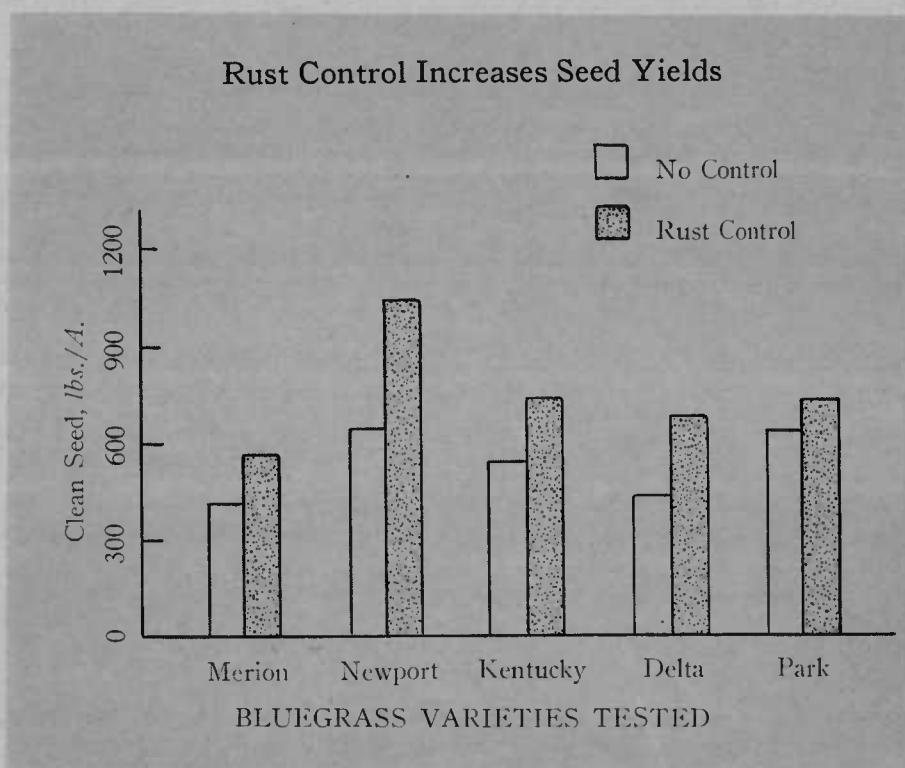
Seed yields increased

Controlling rusts also increased seed yields. Seed comparisons for 1961 and 1962, using the minimum rates given above, are illustrated in the figure.

Hardison found that nickel sprays, used alone, give inadequate rust control and may cause objectionable injury to bluegrass leaves, particularly during April. Injury ranged from white spots at the 1- to 2-pound per-acre level to extensive scalding at higher rates. Adding wettable powder of maneb improved rust control and greatly reduced nickel injury. No injury was noted in field trials when nickel sulfate levels were below 2 pounds per acre in combination with 2 pounds of maneb. Even higher rates of nickel did not affect germination of bluegrass seed, according to preliminary tests.

As a suggested rate, minimum levels of fungicide that have not caused noticeable leaf injury, yet have controlled stripe and leaf rust are 1 to 1½ pounds nickel sulfate hexahydrate with 2 to 3 pounds of a wettable powder containing 80% maneb applied with 40 or more gallons of water per acre. High spray pressure—exceeding 100 pounds per square inch—is desir-

stripe and leaf rusts of bluegrass opens the door for similar control of about 125 other rusts that attack grasses in the United States. Perennial ryegrass, fescues, and many other grasses grown for seed in Oregon may be attacked by one or more of these rusts. Preliminary trials indicate that the control program worked out for bluegrass may be just as successful for controlling rusts on



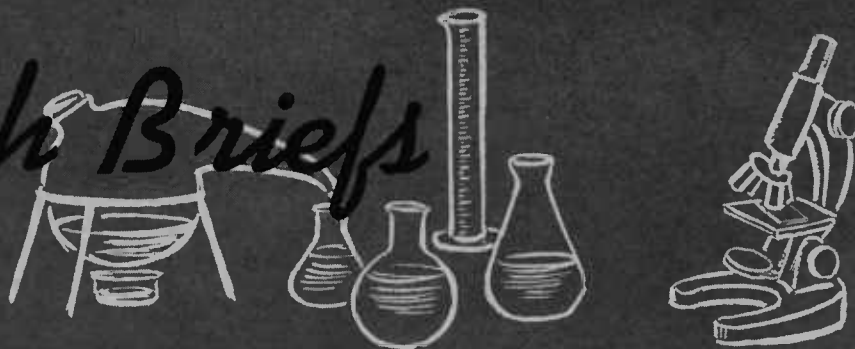
able. Three applications, April 20-25, May 10-15, and May 21-30, may be adequate. Bluegrasses are particularly susceptible to leaf, stripe, and stem rusts after the end of April. Maximum protection is needed during May 10-30. *Treated bluegrass should not be fed to livestock.*

Developing a practical control for

other grass seed crops.

Hardison emphasizes that the fungicide combination should not replace other controls already in use for rust and other diseases. It is still important to burn straw and stubble in old fields. For new plantings of bluegrass, flaming with propane burners in late fall may still be helpful.

Research Briefs



New Insecticide Effective as Harvester Ant Control

A DOUBLE rate of mirex fire ant bait has been effective in controlling harvester ants, according to OSU entomologist H. H. Crowell.

The harvester ant is a pest in the desert area of eastern Oregon. Ants live in mounds and in underground galleries that have been reported to extend 9 feet deep in some cases. They are important to cattlemen and others who use the range, because ant colonies denude an area of grass and other feed surrounding their nests. Ant mounds in Oregon have been noted as large as a foot high and 3 feet across. Crowell estimates that harvester ant colonies can easily denude 5% of an area by clearing the vegetation from around mounds.

Ants feed primarily on seeds—any seed—but seem to prefer grass seed. A large mound can contain a colony of about 1,000 ants.

Crowell's work on harvester ant control began in 1961 shortly after

chemicals were available in bait form for control of fire ants in the southern United States. Screening tests near Redmond, Sisters, and Tumalo revealed that mirex at double strength for fire ant control showed promise as a harvester ant control. In addition, the chemical was low in toxicity to other animals. These tests also showed that the harvester ant was sensitive to temperature changes. Low temperatures drove ants deeper into their galleries. This meant they would not forage outside, bringing in poison bait. Moist weather also hastened the molding of bait, both outside and inside ant mounds. The best time to apply bait, Crowell found, was in late June or July.

Large scale trials conducted

In 1962, the entomologist conducted large scale field trials in cooperation with the Bureau of Land Management. Two 50-acre plots were set out near

Hampton. One plot received 2.9 pounds per acre of 2X (double strength) mirex bait. Another plot received 5.1 pounds of the same bait. Bait was spread with an electric powered cyclone-type seeder mounted atop a heavy duty pickup truck.

Baits were applied July 18 and 19. Ants began picking up bait granules within minutes after application. One month after application, Crowell surveyed 40 treated hills and 6 untreated hills in each plot. For the plot receiving 2.9 pounds of bait per acre, ants in 5 hills were all dead, were very weak and dying in 16 hills, weak in 11 hills, and sick in 6 hills. Ants had abandoned two hills. There were no strong, active broods in any hill sampled. Results of the plot that received the 5.1 pound rate of bait were comparable. All hills sampled in untreated areas were strong and active, with no dead ants either inside or outside the mounds.

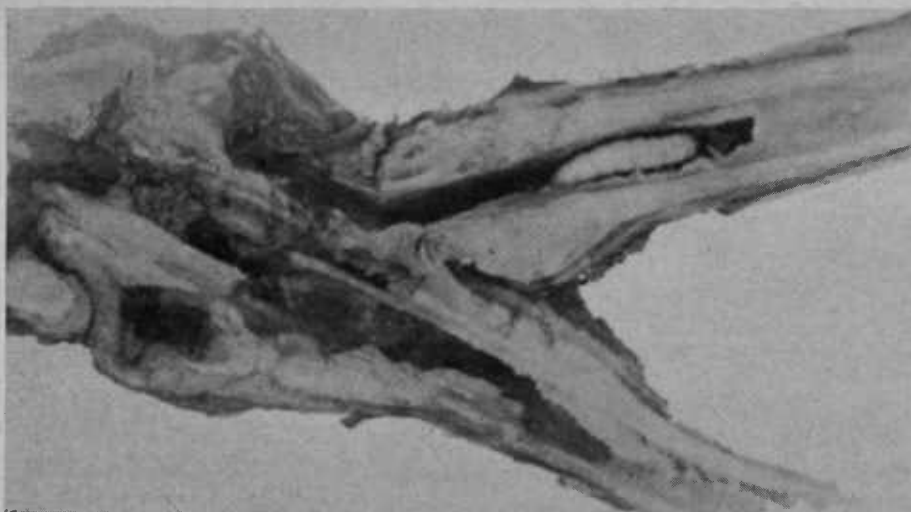
Ants rebuild mound

Crowell observed that ants delayed foraging for bait after the truck had run over a mound. They apparently took time first to rebuild their mound. He reasons that this delay might mean that these ants would not always find enough bait for their extermination. This plus the large, rock-strewn area involved suggests that airplane baiting may be the most practical.

Further research involves testing lower rates of bait plus basic studies on harvester ant behavior. Crowell found, for example, that ants from untreated mounds migrate to mounds where ants have been killed by the insecticide. Thus, long-range control in a small area may not be possible.



Harvester ants in this mound have been killed by mirex fire ant bait. Note small depressions in mound, indicating a lack of ant activity in repairing their mound.



Raspberry crown borer larvae weaken and kill cane berries by feeding in the larger roots, crown, and at the base of canes. Larvae will live for two years.

Drench Controls Raspberry Crown Borer

A PROPERLY timed, thorough application of insecticide will control the raspberry crown borer, according to OSU entomologist R. G. Rosenstiel.

The borer is a serious pest of red and black raspberries, boysenberries, loganberries, blackberries, and other cane fruits. Borers feeding in the larger roots, crown, and at the base of canes reduce plant growth, fruit production, and fruit quality. Leaves of infested young canes of the current season's growth have a reddish color in late summer.

Rosenstiel has spent the past five years studying the borer, three of them testing various controls on experimental plots and on farmers' fields.

He found that either Diazinon or Guthion at 2 pounds of actual insecticide per acre applied as a drench in March to the crowns of plants gave excellent control. The treatment requires at least 200 gallons of drench per acre to obtain good control. Apply the drench by removing the disc from a spray nozzle or by using any type of nozzle that will deliver a high volume of liquid.

Available as wettable powders

Both chemicals can be purchased as 5% wettable powders. Use either chemical at a rate of 8 pounds per 200 gallons of drench per acre. If you use a wettable powder, Rosenstiel recommends that the tank be equipped with

a good agitator to prevent the powder from settling. The chemicals can also be purchased as emulsion concentrates.

Time of spray is extremely important. Rosenstiel found that for best results, drench should be applied between March 10 and March 20. Rain at treatment time will not affect results.

Drenches effective

Current results indicate that drenches are effective only against small larvae. Since the borer has a two-year life cycle, treating infested fields at least two successive years is recommended.

Rosenstiel cautions that drenches recommended for borer control are more concentrated than sprays generally used to control other insect pests. More than ordinary care should be given to handling the materials. Follow the manufacturer's safety precautions appearing on the insecticide label. Of the two materials, Guthion is the more toxic to humans.

Home gardeners may use the same type of treatment to protect cane plants. Diazinon is suggested since it is readily available in small packages. Home garden emulsion concentrate formulations of Diazinon usually contain 12½% active ingredient. Use this formulation at the rate of 2½ tablespoons per gallon of water, and apply 2½ to 3 pints of drench per plant. Apply in March with a sprinkling can or other similar device.

Vetch Seed Has Chemical Toxic to Chicks, Poults

COMMON or hairy vetch seed in feed can reduce growth and in some cases cause mortality in chicks and poults.

That's the report from OSU poultrymen J. A. Harper and G. H. Arscott.

They found that common vetch which made up 20% of the chick ration caused almost complete mortality; 30% caused mortality for poults. Hairy vetch seed was found to be less toxic. But growth was reduced when either type of vetch seed made up only 10% of the ration.

Interest in mortality

The poultry scientists became interested in the possibility of vetch seed causing chick and poult mortality during another study on the cause of internal bleeding of turkeys. Research workers at Wisconsin had demonstrated that a substance in sweet pea seed had caused internal bleeding in poults. Harper and Arscott became interested in testing common and hairy vetch seed because vetch was in the same botanical family as sweet pea and was a common "weed" in many Oregon grain fields.

Autopsies of dead chicks and poults revealed that the toxic substance in vetch seed did not kill birds by internal bleeding. Why the birds died is still unknown.

The toxic substance dissolves in water, and loses its toxic effect when seed is heated. Seed soaked in water five times its weight, then dried for 24 hours still killed chicks and poults. In addition, water used for soaking seed killed birds after they had consumed it.

Seed heated

Evidence that vetch contains a toxic substance was underlined when seed heated to 100° centigrade for 8 hours, did not kill any birds after it had been fed.

Harper and Arscott are currently testing several forms of neurotoxins. They hope that a crude form extracted chemically from common vetch seed will have the same effect on mortality that common vetch seed does when fed to chicks and poults.

"Many farmers fear it is too late to achieve the reforms that are needed."

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Property tax has value

The evidence is clear that the property tax does not stack up well in light of the criteria enumerated. The fact that the property tax is not entirely circumspect does not mean it is without value. It has some practical advantages. It has the ability to provide a relatively definite amount of revenue from year to year to meet increasing demands. The amount of revenue is not affected by changes in economic activity to the extent a net income tax is. Real property is difficult to conceal; widespread evasion of the tax is impossible.

To bring our system of financing local services more nearly in line with generally accepted criteria of how the costs should be distributed, changes obviously are needed. The first major change needed is to reduce overall reliance on property tax revenue at the local level.

It is entirely appropriate to maintain the property tax to supply funds for local "common good" services such as fire and police protection, roads, public health, and other general services from which property benefits.

Another change needed is to return to the tax rolls much of the tax-exempt property. With lower tax rates due to small local revenues to be raised and a broader tax base, perhaps there is less need to exempt and accord special treatment.

Revenue from other sources?

Assuming an unwillingness on the part of the majority of the people in a voting jurisdiction to accept fewer and less costly services, the loss in revenue from reduced property taxation would have to come from another source or sources. Several possibilities are available. One that should receive serious consideration is to increase the state share of education expenses through the basic school support fund. It is further possible to share state-collected taxes through state grants-in-aid or for the state to assume directly some of the services and administra-

tive responsibilities of local units of government. Generally action along these lines is not acceptable because it goes contrary to the principle of home rule. Nevertheless it is a means whereby some relief from property taxation might be obtained.

State needs monies

If the revenue emphasis is shifted from local taxation to the state general fund, the state must have additional monies. A more broadly based and more heavily graduated net income tax meets theoretical and practical considerations as a way of obtaining increased revenues.

Another alternative is to go to a general sales tax either as a supplement to income taxes or to replace income as the basic revenue source. The general sales tax has not been acceptable in the past to the voting public in Oregon, but may have more appeal if tied in as an offset to property taxation.

A third alternative would be to tax gross income, including wages and salaries with practically no personal exemptions. This would provide a broad base for sharing the costs of government. Indiana, as one example, relies heavily on this source of revenue.

Improve efficiency

It should not be forgotten that improved efficiency of local spending is possible and would give some relief to property. Consolidation of local units of government and services, including educational administration and facilities, could be significant, but is not adequate to provide the needed relief.

The thesis presented here suggests that farmers are adversely affected by the property tax, that the property tax fails to meet stated criteria for distributing the costs of locally rendered services, and that certain changes in the system of financing local government are needed. The challenge to all who feel the property tax is oppressive is to work out alternative revenue sources acceptable to the voters of the state. Many farmers fear it is too late to achieve the reforms that are needed. Waiting longer will not help. Action is needed now!

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