MINNESOTA FEED SERVICE

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# Hay in Pellets, Bales, or Wafers?

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Newly developed methods of handling our forages have caused the livestock producer, the equipment manufacturer, and the feed dealer to give a complete reappraisal to harvesting and handling of hay.

A very confusing and complicated picture of haying operations is the result. There are many avenues leading to quality forages. Hay in its natural form is bulky and difficult to handle. It is a mass of connecting stems and leaves that powders and shatters when too dry. And when too wet, it heats, molds and ferments.

Many systems and types of machinery are being developed. In general, there are two aspects to the problem: (1) quality improvement, and (2) material handling.

In past years, speeding up haying operations resulted in little quality improvement in hay put up on farms. The opposite was true. So-called "old-fashioned" loose hay with little mechanical handling had an advantage over baled or chopped field-cured hay.

## Quality Improvement

Methods now being used in an attempt to preserve the potential value of our forages include dehydration, barn curing, and crushers or conditioners. These attempt to prevent the normal losses associated with field-cured hay—shattering of leaves, bleaching by the sun, and leaching by rain. The value of the forages resulting determine if the costs are justified by the quality retained. We should never forget this important aspect of forage crop production.

## Material Handling

Chopping, baling, wafers and pellets offer ways to handle this bulky material.

**Chopped hay** depends on the move- of hay by an air stream or conveyor and reduces the hand labor. When field-dried it presents about the same problems in storage as loose long hay. When forced-air dried for quality retention, additional problems of loading and storage came up. Self-feeding of chopped hay can be very successful.

**Baled hay** is a package compressed to lower its bulk for easier movement from field to storage to feedlot. Because of its reduced bulk, storage capacity is increased. Due to the size of the bale, hand labor is required in handling. Newly designed equipment for the field handling of bales looks very good, however. A complete self-feeding operation is impossible with baled hay. Possibly our conventional bale could be redesigned for better handling.

**Wafers** are a new, smaller package of hay which will reduce hand labor and permit bulk handling and easy storage. A wafer is usually made of coarsely chopped or loose long hay. They are made in sizes from 2 to 5 inches in diameter and 1 to 2½ inches thick. They can be self-fed.

Pelleting mills are in operation, but practical wafer machines are not yet developed. Ideally, wafers should be made at 40 percent moisture before leaves start to shatter. They could then be dried by forced air or placed into sealed storage units and allowed to ferment and make a high quality low moisture silage. No such machine exists.

**Pellets** are produced in a standard pellet mill, using ground material for easier operation and greater capacity. The pellet could be considered either as a means of handling hay or as a means of feeding hay—either alone or with other component parts of the ration included in the pellet. Pellets increase costs, because of grinding and pelleting itself, but this may be more than offset by increased consumption and less wastage in feeding. Complete self-feeding with pellets is possible. Quality retention is only possible with the extra costs of dehydration.

Which of the four listed means of handling hay a farmer chooses must then be based on the quality aspect, material handling, reduction of labor, storage requirements, and comparative costs of the various systems. For example, chopping or baling of field-cured hay leaves much to be desired in terms of quality. Labor load still is high. Self-feeding possibilities are limited.

Pelleting is showing much promise—not only for hay, but also for crops such as sorghum, the whole corn plant,

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**Left to right: Two types of hay pellets; two types of hay wafers. Behind each of these four types is the amount of hay it contains. Six-inch ruler indicates relative size.**

* Associate professor of agronomy.

# Weed Control with Chemicals

HARLEY J. OTTO*

The development of weed-killing chemicals for application at the time of planting corn and soybeans (or shortly thereafter) is one of the most recent advances in weed control. This practice is called "pre-emergence" application.

The advantage of this practice are:

1. With suitable attachments on the planter, planting and application of the chemical can be combined into one operation.

2. In some cases pre-emergence applications are the only ones that will not damage the crop.

3. The chemicals control weeds during the early stages, at a time when competition is extremely important.

4. The first cultivation can sometimes be delayed, meaning the crop will be larger and can be cultivated more rapidly.

The chief disadvantage is that the chemical is applied before the operator knows exactly what his weed problems will be. Also, the amount of rainfall and soil temperature following application is extremely important in determining the effectiveness of these chemicals. But the weather cannot be accurately predicted at the time of application. This is an important consideration, because the chemicals are quite expensive.

### Simazin for Corn

Chemicals which have looked most promising in research plots are Randox and simazin. At 4-5 pounds of active ingredient per acre, Randox has given good control of annual grass weeds in corn and soybeans.

Simazin can be used on corn for controlling both annual grasses and broadleaved weeds. The rate of application for this chemical is 2-4 pounds active ingredient per acre. The 2-pound rate would probably be enough for sandy soils, while 3 pounds would be needed for heavier-textured soils. On soils with a high organic matter content, 4 pounds per acre should be used.

Treatment with a band of chemical over the row can lower the cost per acre, compared to broadcast application. The weeds between the rows can then be controlled by cultivation.

To determine the amount of chemical needed to treat an acre where band application is made, it is necessary to consider the rate of application per acre, the band width, and the distance between rows.

For example, if the rows are 40 inches apart and if the band is 12 inches wide, the farmer would actually be treating 12/40 or 0.3 of his total area. Using simazin at 3 pounds per acre of active ingredient would call for 6 pounds per acre of the 50% active product. But since he is using band treatment he would need 6 pounds x 0.3, or 1.8 pounds of the product for each acre of corn he is going to treat.

(*Note these precautions:* Randox is quite irritating to the skin. If this chemical comes in contact with the skin, wash it off immediately. If it is spilled on the clothes, remove them immediately and wash them before wearing again.)

The problem of soil residues with simazin is not fully understood. In some cases, the chemical has injured crops other than corn the year after application. This is probably related to rate of application, soil type, amount of rainfall during the growing season, and other environmental factors. However, corn is extremely tolerant of this chemical, so there will be no danger from growing this crop the following year.

Since simazin is not water soluble, continuous agitation must be used in the sprayer to keep the chemical in suspension. Also, this chemical is abrasive and will cause extreme wear on gear pumps. Therefore, it should be applied with a sprayer using a roller or centrifugal pump. It is also a good idea to recalibrate the sprayer periodically since the material will cause nozzles to wear.

These chemicals are now available in granular form, which preliminary research indicates to be as effective as sprays.

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# SOIL INSECTICIDES

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Farmers are rapidly making more use of insecticides to control or prevent injury by insect pests which attack the underground parts of plants. Most of this use is in corn, certain vegetables, and sugar beets.

There are two general methods of applying these chemicals to the soil—broadcast and band, or on the row. Either liquid sprays or granular formulations may be used for either method.

Broadcast treatments are applied shortly before planting and worked into the soil immediately. Deep plowdown of soil insecticides is not advised. The band application may be made at planting time with a planter mounted sprayer or granular attachment. A band of insecticide should be put just above but not in direct contact with the seed.

Combinations or mixture of insecticides and fertilizers present some problems. The mixtures may be broadcast if they are worked into the upper 5 or 6 inches of the soil, not plowed down deeply. They may be used with planter fertilizer attachments if the bands are placed above the seed. However, if the fertilizer attachment puts the material below and to one side of the seed, the insecticide should not be mixed with the fertilizer but applied separately.

In using the insecticide-fertilizer mixtures care should be taken to insure the recommended rates of application for each material as well as the proper placement for best results.

The rates of application vary depending on the crop, pests involved, and soil conditions. For corn rootworm control, either aldrin or heptachlor is recommended at 1 pound of actual insecticide per acre when broadcast or ½ pound per acre as a band treatment. These rates must be increased to control some of the harder to control pests, such as wireworms, or in heavy soils.

* Extension entomologist

# Feeding Pointers for Little Pigs

R. J. MEADE*

It has often been said that the only pigs bringing a profit are those marketed over and above an average of five pigs per litter. Such a statement may apply generally, but improved feeding and management practices may help to reduce the number of pigs required to pay overhead costs, as well as aid in increasing the total number of profit pigs per litter.

A good program for prevention of nutritional anemia, the use of a good pig starter, and a well organized program on those items that subject pigs to stresses will help a producer to market a higher percentage of the pigs farrowed alive.

### Prevent Nutritional Anemia

Nutritional or iron deficiency anemia, a condition in which the hemoglobin content of the blood is reduced, was recognized and described many years ago. Giving the pigs access to clean uncontaminated sod or painting sow's udder with a saturated "copperas" (crude iron sulfate) solution starting when the pigs are 3 to 4 days of age and continuing until 4 to 5 weeks of age are well-known and effective means of preventing this condition. However, the disease is still found on many farms.

Nutritional anemia itself may not kill many pigs. But anemic pigs have lower resistance to infection and many of them may succumb to secondary diseases. In addition to the above methods, the more recent injectable iron compounds will also prevent the condition.

Recent work at the University of Minnesota shows that pigs injected at 3 to 4 days of age with 100 milligrams of iron (Irondextran) in 2 cc. of the preparation maintained excellent hemoglobin levels until 21 days of age. After this age, the hemoglobin levels declined unless the pigs were given supplemental dosages of 50 or 100 milligrams of the iron compound. These declines were in spite of the fact that the pigs were eating sizeable amounts of pig starter containing a trace mineralized salt.

It appears that suckling pigs treated in this manner should be given a supplemental dose of iron as indicated above at approximately 21 days of age, or that some other methods of supplying additional iron should be employed starting when the pigs are about 18 to 21 days of age.

Work is now underway investigating new iron compounds, the value of larger dosages of injectable iron when the pigs are 3 to 4 days old and also when they are a week old. There is some danger of iron toxicity if unproven compounds are used. It is also important that the potency of the compound by known. The dosage should provide at least 100 milligrams of iron. This means the *amount of iron per* cc. *of material* should be checked rather than going by the number of cc. of the material to be injected

### Feed a Good Pig Starter

Most persons interested in swine nutrition define a good pig starter as one high in energy, adequate in high quality protein (16 to 18 percent), low in fiber, adequate in minerals, and palatable. Nearly all pig starters contain supplemental amounts of the vitamins and from 50 to 100 grams of an effective antibiotic per ton of starter.

From 10 to 15 percent of sugar is included in many starters to improve palatability. In some instances equivalent sweetness may be provided from saccharin. Other taste teasers, or palatability agents, are also used. Milk products also find considerable favor in these feeds, particularly the prestarters.

Results of research work at the University of Minnesota, like most at other Agricultural Experiment Stations, show that pigs can be successfully weaned to a dry ration at 2 or 3 weeks of age. Pigs weaned this early gained just as rapidly as did pigs that nursed the sow. They did take slightly more feed per pound of gain to 8 weeks of age, but the net cost of the pigs was about the same at weaning time regardless of method of production.

However, after the early-weaned pigs reached 8 weeks of age, they gained at a slightly slower rate and less efficiently than did pigs that nursed the sow until they were 8 weeks old. Other advantages, such as rebreeding the sow immediately after early weaning of the litter, properly sequencing the multiple farrowing program, and more total pigs per sow per year may offset this disadvantage.

Some producers will do a good job of raising their pigs whether they wean them at 2, 3, 5, or 8 weeks of age. This is because they prevent anemia, they feed a good pig starter, and they do not subject their pigs to several stresses at one time. The gains of the pig while nursing the sow, or during the period of 2 to 8 weeks of age, are the most economical that it puts on during its life.

In a 1958 University of Minnesota study, 445 pigs from 48 litters were weaned at 5 weeks of age. They consumed about 40 pounds of good pig starter per pig during the period between 2 and 8 weeks of age. These pigs averaged 1.35 pounds of starter per pound of gain during this period and the average 8-week weight for the pigs was nearly 40 pounds. These gains were economical. The pig starter got the pigs off to a good start so that they were thrifty, vigorous, and ready to perform well when put on the growing-finishing rations.

Many producers try to accomplish too many things when they may have the pigs penned at any one time. The pigs should be castrated when small, usually at about 2 weeks, and not when they are weaned. Likewise, the pigs should not be vaccinated for hog cholera, or hog cholera and erysipelas, on the same day that they are weaned, or on the same day they are castrated.

Some producers like to vaccinate their pigs 2 weeks prior to weaning, or at about 6 weeks of age, and others will prefer to wait until 2 weeks after weaning. Pigs should not be weaned, grouped into new and larger groups, and moved to new quarters on the same day. They should be given a few days to become accustomed to new rations and to shifting for themselves before making drastic changes in environment. Do not subject the pig to more than one stress at a time and losses from some diseases will be reduced.

* Associate professor of animal husbandry

## HAY PELLETS, ETC.

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and Coastal Bermuda grass in the south. Pellets have the following advantages:

1. A minimum of labor in feeding and possible self-feeding of all classes of livestock.
2. Higher nutritive value.
3. Minimum waste.
4. Increased feed efficiency.
5. Added gains due to higher intake.
6. Feed uniformity, eliminating selective feeding.
7. One-fifth to one-sixth of the amount of space required for storage than for loose or chopped hay.

There are also some distinct disadvantages:

1. Increased costs.
2. Need to dry to 20 percent moisture or under.

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## CLEANING FLAXSEED DEFINITELY PAYS

C. MILTON ANDERSON*

Flaxseed handling and marketing practices are important to country elevators. The USDA Marketing Research Division recently found that cost of marketing flaxseed by county elevators was 5.6 cents more per bushel than for other grains. Half of this additional cost was in handling at elevators. The rest was from higher freight costs.

Handling of excessive dockage is the greatest single—and avoidable—cost to country elevators in the flaxseed market. In this area, elevators shipping flaxseed containing 15 percent dockage pay over 3 cents per bushel more for freight than elevators shipping only 5 percent dockage. Returns from sale of screenings usually are more than the costs of flaxseed cleaning.

With the increase in flaxseed cleaning, new outlets have developed for use of flaxseed screenings in livestock and poultry feeds. So cleaning definitely pays.

Next to handling excessive dockage, shrinkage losses are the most expensive cost in marketing flaxseed. Together with the higher value of such losses, the greater shrinkage in flaxseed as found in the recent study cost the elevator between 1.2 and 2 cents more per bushel for marketing flax than is true with wheat.

* Agricultural economist, USDA Agricultural Marketing Service

# What's New in Farm Research?

**Beginning with this issue, Minnesota Feed Service will periodically report results from recent University of Minnesota research on matters of special interest to retail feed, seed, and fertilizer dealers.**

**Potash fertilizer and an insecticide can sometimes help reduce lodging in corn.** In extension demonstrations in Nobles county last summer, a group of specialists found that spraying 1½ pounds dieldrin per acre resulted in less corn down than on untreated plots. Using the dieldrin treatment and 47 pounds of potash per acre also resulted in less lodging. And dieldrin and potash together resulted in fewer broken and leaning plants than where dieldrin was applied alone.

★ ★ ★

**Where corn yielded only 60 bushels per acre or less without fertilizer last summer, adding plant food this year will probably help.** Of 218 fields in the 1958 X-Tra Corn Yield contest, 48 yielded under 60 bushels. Adding fertilizer to these plots increased yields by 33.7 bushels. Return over fertilizer cost went up by $14.85 per acre.

★ ★ ★

**Excess compaction—like you get from too much disking—can lower both quality and yield of farm crops.** Soil physicists last summer found that experimentally compacting both the surface and subsoil lowered corn yields by 13 bushels per acre. Surface compaction cut potato yields by two-thirds and spuds in compacted soil were 0.56 inch smaller in diameter. Also, compacted soil showed more mis-shaped potatoes.

★ ★ ★

**The degree of "water solubility" of potassium fertilizer apparently has no effect on crop yields.** Corn fertilized with potassium metaphosphate and potassium pyrophosphate—two "low solubility" fertilizers—yielded as well as fields getting potash in conventional high-solubility form.

★ ★ ★

**Compared to other varieties, Vernal is by far the best alfalfa Minnesota farmers can seed this year.** Several years of trials show it to be more winter-hardy and resistant to bacterial wilt than any other variety. For example, Vernal averaged 4.86 tons of dry forage per acre over a 3-year period at the Rosemount Experiment Station. Ranger, the only other recommended variety, yielded 4.37 tons. This was in plots where wilt was definitely a problem.

★ ★ ★

**Sorghum and corn in 42-inch rows are good emergency forage crops for land that needs to be reseeded in the middle of June.** In last summer's trials, both yielded more than 5 tons dry matter per acre when planted in mid-June and harvested in late September. Corn was planted at 30,000 plants per acre with special equipment; 15 pounds per acre was the seeding rate for sorghum.

## HAY PELLETS, ETC.

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3. Reduced butterfat test when finely ground roughage is fed in the pellet.
4. Lack of simple machines capable of field pelleting.
5. Refusal of some animals to eat the pellets.

At the present time, pellets offer distinct possibilities for beef and lamb feeding. Forages mixed with energy feed, corn, or barley can be used with success. Custom pelleting is now being done in many areas of the country.

Wafers have few of the advantages of the pellets. They appear destined to many years of development.

### Complicated Hay Handling

Many problems in the material handling and quality retention still persist. Widespread use in the midwest will have to depend on the installation of pelleting machines in the area and then evaluation of pellet feeding operations.

Many questions remain on the practice of forming pellets—such as density content, protein and fiber percentage of pellets.

What combination of machines one should use to insure quality and efficient handling is still unknown. A great deal of research, testing and farm observations will have to be completed. Feeding studies with types of hay and packaging of hay will have to be run. We are a long way from putting a hay wafer in every manger and a pellet in every feed box.

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