MINNESOTA FEED SERVICE

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Many New Crop Varieties Recommended

H. K. HAYES*

A LIST of recommended varieties of farm crops for Minnesota is made up annually at a branch station conference attended by subject-matter specialists at University Farm including agronomists, plant breeders, plant pathologists, entomologists, soils specialists, and cereal technologists, and the superintendents and agronomists at the branch experiment stations.

To be eligible for recommendation a variety must have been tested in experimental plots for at least three years, and all varieties of each crop are tested the same way. Tests for reaction to disease or insect pests are made in specially-prepared nurseries at University Farm. The following is the list and reasons for addition or removal of varieties. A more complete summary may be found in Extension Folder 22, Improved Varieties of Farm Crops.

Wheat

No changes were made in the list of recommended varieties of wheat this year. Recommended spring wheat varieties for west central and northwestern Minnesota are Lee, available in large quantities for the first time this year, and Mida, the major spring wheat variety grown in the United States. In the past both Lee and Mida have been resistant to black stem rust. Lee is also resistant to leaf rust, but Mida has been susceptible in recent years. Rival is recommended for all sections of the state, especially in southern Minnesota as it is less susceptible to scab than Lee and Mida.

Minturki and Minter winter wheat and Carleton, Mindum, and Stewart durum varieties are still on the recommended list.

Oats

With oats Zephyr was removed from the recommended list and Branch, a new variety from Wisconsin, was added. As Zephyr has yielded no better than some of the other varieties, it was removed from the list because of its long, strong awn.

Recommended varieties include Bonda, Clinton, Mindo, Andrew, Shelby, Ajax, James, and Branch. Ajax was one of the highest yielders on the average. It has a higher hull percentage than Andrew and when these two varieties are placed on a comparable hull basis Andrew gave an average yield of 79.4 bushels and Ajax 79.1.

It is of considerable interest that Shelby, which has been tested in all trials carried out since 1948, was second highest in yielding ability. Shelby also was superior to Ajax and other varieties in low hull percentage but somewhat less desirable than Andrew and Clinton in this respect. In our trials Shelby has stood up about as well as Gopher but is not the equal of Bonda, Mindo, Clinton, and Andrew.

Bonda still leads in weight per bushel and is well thought of by many farmer-growers. We have had various reports that chickens prefer Bonda over most other varieties. The new hull-less variety, James, has continued to perform well. Its main drawback is the difficulty of keeping it from heating in the bin.

Barley

For barley both Barbless and Mars were removed from the recommended list. Barbless has been thought of as a malting variety but Kindred has become the most popular variety for this purpose in Minnesota. While Moore is still on the recommended list, it should not be considered a malting variety because it has not found favor with the processors.

Mars was replaced on the recommended list by Vantage. Vantage, like Mars, has stiff straw and has been the highest yielding variety in the trials, proving superior in almost all localities. But it is a feed barley and should not be grown for malting purposes. Peatland was left on the recommended list for limited use only in the northeast.

Rye

No changes were made with rye; Emerald and Imperial are still the two recommended varieties. Emerald has proved superior to all varieties on sandy soils and without doubt is the leading variety.

Flax

With flax Dakota was dropped from the list because of widespread damage from rust. The six varieties now on the list include Redwing, Minerva, Koto, B5128, Redwood, and Marine. Marine, which is rust-immune and is now in the process of first seed increase, was bred at the North Dakota Agricultural Experiment Station. Some seed has been furnished the Minnesota Station for first increase. This new variety is early maturing and together with Redwood probably will furnish the larger part of the acreage in the years immediately ahead.

The flax varieties available are all desirable for certain conditions and the grower need only consider his needs to make a satisfactory varietal selection. Thus, if the grower must plant rather late, he should use early maturing varieties such as Marine or Redwing. He would be unwise to use Redwood, however, since it is quite late in maturity.

Soybeans

The increase in acreage of soybeans is due, partially at least, to the fact that seed varieties are now available for all soybean regions. Two varieties were removed from the recommended list at the conference. These are Habaro and Manchu Wis. 606. These varieties have been on the recommended list for many years and are adapted primarily to south central and southern Minnesota. Habaro has many desirable agronomic characteristics but is somewhat low in oil percentage.

* Professor and Chief, Division of Agronomy and Plant Genetics, University of Minnesota.

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Recommended varieties now available include Blackhawk, of which there is considerable seed for 1952, and Monroe, of which sufficient seed can be obtained for all growers. Both Blackhawk and Monroe may be thought of as full-season varieties for south central and southern Minnesota. Monroe frequently performs well also in the southern one-third of the Central Corn Maturity Zone if planted early.

Capital and Ottawa Mandarin have continued to give excellent yields for the central part of the state, Capital being slightly later than Ottawa Mandarin. Flambeau has yielded relatively well in all sections of the state and is the only recommended variety available for the Northern Corn Maturity Zone.

Corn

A brief summary will be made for corn and other crops. Minhybrids 604 and 407, which have not been grown to any great extent in recent years, were both removed from the recommended list. One new Minhybrid, 508, was added to the recommended list for the South Central Zone, but seed will not be ready for seed growers until 1953.

Four new Minhybrids for the Southern Zone, numbers 409-12, were approved for seed increase. Large quantities of seed will be available for seed growers of Minhybrid 410 in 1952. Numbers 409, 411, and 412 will not be available for seed growers until 1953.

Other Varieties

No changes of importance were made with other varieties of farm crops. The list of recommended varieties includes Advance sunflowers; Ladak and Ranger alfalfa; Wegener and Midland medium red clover; Evergreen and Madrid sweet clover; Empire birdsfoot trefoil; Lincoln, Achenbach, and Fischer brome grass; Itasca and Lorain timothy; and Piper, the new variety of sudan grass produced at the Wisconsin Station. This new variety has a low level of hydrocyanic acid potential and is more resistant to leaf blight and anthracnose than common varieties. Foundation seed was produced in considerable quantities in 1951 and will be available for registered seed growers this year.

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What About Methionine, Choline, Betaine, and Vitamin B_{12} ?

FRANK M. CRANE*

SOYBEAN OIL MEAL now is the leading protein supplement for livestock and poultry feeding because of the large quantity available and the high quality of its proteins.

However, soybean oil meal contains less calcium, phosphorus, and iron than animal by-products such as tankage or meat scraps. It also is somewhat lower in the vitamins, riboflavin and niacin, and the amino acid, methionine, than the animal by-products. These shortcomings should be considered when soybean oil meal is used in swine or poultry rations.

During the last few years investigators have attempted to supplement rations based on corn and soybean oil meal, so that they will be equal to rations which contain supplements of animal origin. At the University of Illinois, for example, significant increase in average daily gains of pigs weighing between 33 and 75 pounds was obtained by adding six crystalline B vitamins (thiamine, riboflavin, pyridoxine, pantothenic acid, niacin, and choline) to the corn-soybean oil meal basal mixture. Later research revealed that choline was responsible for most of the increase in rate of gain.

Methionine vs. Choline

In further studies the Illinois workers tested the effects of adding choline and methionine separately and together to a corn-soybean oil meal basal mixture. The addition of either choline or methionine gave a significant increase in the daily rate of gain, and they produced about equal results. **The addition of both methionine and choline produced no faster growth than either one alone.** Earlier studies by others with rats and dogs had shown that there is an interrelationship between methionine and choline, and one can be substituted for the other to a certain extent.

At present we recognize that methionine has two jobs in metabolism. It is first an essential building stone for the proteins of flesh, milk, and eggs. Second, under certain conditions it can furnish "labile methyl groups" which are needed for certain essential chemical reactions in animals or birds.

Choline, too, furnishes labile methyl groups, and if the ration is low in choline, methionine must furnish the labile methyl groups. If the methionine level of the ration is borderline and part of it goes for furnishing labile methyl groups, then protein formation is reduced and the result is, of course, poor growth.

* Frank M. Crane is a former instructor in the Division of Animal Husbandry.

1. Methionine, choline and betaine, and vitamin B_{12} have one purpose in common—they are all concerned with the supplying of "labile methyl groups" and their transfer within the body. In this way these compounds are interrelated.

2. Methionine builds body protein and cannot be replaced by choline or vitamin B_{12} for this purpose.

3. Choline prevents perosis in chickens and this function cannot be fulfilled by methionine or vitamin B_{12}, and apparently not entirely by betaine.

4. Vitamin B_{12} has a specific job in blood formation, and this job cannot be taken over by methionine, choline, or betaine.

Choline, like methionine, has other jobs in nutrition besides supplying labile methyl groups. Choline affects fat metabolism and is also essential for the prevention of perosis in chickens and turkeys.

Recent experiments indicate that choline is converted to the compound, betaine, and that it is this compound that supplies the labile methyl groups, rather than choline itself. In experiments to determine whether choline and betaine are interchangeable, it was found that they were of equal value in the pig rations used. In this particular test neither choline nor betaine increased the growth rate of pigs. However, in this trial the ration had been supplemented with vitamin B_{12}, so investigators suggested that B_{12} had reduced the pigs' need for choline (or betaine).

In experiments with chicks at the University of Minnesota possible interrelationships of choline, methionine, and vitamin B_{12} were studied. The chicks were fed a corn-soybean oil meal ration, fortified with bone meal, oyster shell, salt, manganese, vitamins A and D, and riboflavin.

The conclusions from this study were that much less vitamin B_{12} is needed with methionine, but choline had much less of this sparing action than methionine.

What's New in Feeding Suckling Pigs?

L. E. HANSON*

THE VALUE of antibiotics in the rations of weaned pigs has been demonstrated clearly in dozens of experiments reported the past two years. But as yet, few data have been published on the value of antibiotics in creep rations or pig starters for suckling pigs.

Dr. L. E. Carpenter, working at the Hormel Institute at Austin, was the first to demonstrate that an antibiotic was a useful addition to a creep ration. Carpenter fortified a creep ration of rolled oats with various levels of aureomycin. In these tests two grams of aureomycin per 100 pounds of rolled oats produced pigs with a weaning weight of 33.1 pounds. Other pigs fed rolled oats without the antibiotic supplement weighed only 21.9 pounds at weaning age (56 days). Levels of four grams or of eight grams of aureomycin produced no better results than the two-gram level.

In a Nebraska experiment 0.18 gram or 0.63 gram of streptomycin per 100 pounds of creep feed had no effect on weaning weights of the pigs to which it was fed.

Four Antibiotics Studied

Last spring several experiments were completed at University Farm to study the value of aureomycin, terramycin, bacitracin, and penicillin as supplements to a creep mixture for suckling pigs.

In the first test the creep mixture was composed of 40 per cent ground corn, 40 per cent rolled oats (oat meal), 10 per cent dry rendered tankage, 9.5 per cent soybean oil meal, and 0.5 per cent iodized salt. Bacitracin, aureomycin, or terramycin were added to the creep mixture at levels of 0.5 gram per 100 pounds of creep feed.

The table shows that average daily gains improved either with aureomycin or terramycin. There was no improvement with bacitracin, though it should be noted that the pigs in this group did not eat as much creep feed as the other groups. It should be noted too that aureomycin and terramycin improved the growth rate even though they were fed at levels only one-fourth as great as the lowest level used by Carpenter. This does not mean that the 0.5-gram level is as effective as the two-gram level, for these experiments tested only one level of fortification. The most desirable level of fortification will undoubtedly vary somewhat because of the variable state of health of pigs on different farms.

In the University Farm experiments both aureomycin and terramycin prevented scours following vaccination for cholera. Bacitracin was less effective than the other antibiotics in this respect. The control pigs scoured quite severely.

In later experiments procaine penicillin was the antibiotic used. In these tests no increase in growth rate occurred when the penicillin was fed at a rate of 0.5 gram per 100 pounds of creep feed. It is planned to test the value of penicillin at different levels this spring, for it may be that the 0.5 gram level is inadequate for a creep ration and that higher levels will be effective.

MILK SUBSTITUTES

Late in November 1951 the newspapers and several national magazines carried a story that the development by an Eastern concern of a synthetic milk for baby pigs was about to revolutionize the swine industry. Minnesotans can be proud of the fact that approximately six months earlier a Minnesota company had developed such a product and placed it on the market.

Synthetic milks for baby pigs are not new to the research workers in the various experiment stations. Many workers, including Dr. L. M. Winters and his associates at University Farm, have worked on this problem for many years. In the past one of the big headaches for the worker was how to control scours in the small pigs. The development of antibiotics has largely solved this problem, and it is the antibiotics principally which make the use of synthetic sow's milk a practical possibility now.

The raising of pigs by feeding synthetic sow's milk is not as simple as the news stories imply. The newborn pig is quite immature and needs especially good care the first few days of life. The pig's heat-regulating mechanism does not operate well at birth, so he is easily chilled and severe chilling will cause death. If the pigs are taken from their mothers at an early age, it is extremely important that they be kept warm and out of drafts. Sanitation is also extremely important.

The use of synthetic sow's milk will not contribute much toward decreasing death losses of pigs from birth to weaning, except in unusual cases (such as vicious sows or some forms of baby pig disease). The reason for this is simple. No one can raise, artificially or with the sow, pigs that are born greatly undersized, weak, or deformed. There is ample evidence to show that much of this loss is due to poor feeding of the sow during growth and pregnancy.

Synthetic sow's milk is not the answer to high death losses in baby pigs. Good nutrition of the breeding female during growth and pregnancy, together with disease control, are the principal factors in the solution of this problem.

Synthetic Milk No Cure-All

While some pigs have been raised from birth on synthetic milk (without nursing the sow at all), failures occur too frequently to make this a recommended practice. It is clear that allowing the pigs to nurse their dams for a few days after birth is the most practical method to follow at present, even though synthetic milk will be used during most of the nursing period.

Allowing the pigs to nurse for a few days will greatly increase their chances of survival. The sows can be rebred if desired, and under this scheme it is possible to produce three litters per year from each sow instead of two. Stated another way, two sows can produce as many pigs in a year when they need nurse them only a few days, as three sows which nurse their pigs to eight weeks of age.

During the next few years thousands of pigs will be weaned at a few days of age and raised to weaning age on synthetic milk. The products now on the market are excellent when properly used, and we can expect that additional research will make them better than they are today. To use these products successfully requires good care and management on the part of the producer, however. A feed cannot be made so perfect that care and management, including sanitation, can be ignored.

Effects of Aureomycin, Bacitracin, and Terramycin on Growth of Suckling Pigs, Spring 1951

Supplement*	None	Bacitracin	Aureomycin	Terramycin
No. of pigs	28	26	28	29
Av. initial wt., lbs.	17.2	15.7	17.1	17.1
Av. final wt., lbs.	25.8	24.4	31.7	28.8
Av. daily gain, lbs.	0.37	0.37	0.64	0.51
Total creep feed eaten, lbs.	300	188	300	300

* Antibiotics were fed at a rate of 0.5 gram per 100 pounds of feed.

* Professor of Animal Husbandry, University of Minnesota.

Alfalfa-Brome Makes Best Pasture Base

A. R. SCHMID*

WHAT IS THE BEST legume-grass mixture to grow on my farm? This is a question which many farmers ask and one which seems difficult to answer. However, if you know the characteristics of the individual pasture plants which can be used in Minnesota, it is not difficult.

Alfalfa–Brome-Grass Base

You can't go wrong if you build a mixture for rotation pasture (pasture left down two or three years in the regular crop rotation) around alfalfa and brome grass, provided alfalfa grows well on your farm. Numerous experiments have shown that alfalfa and brome grass are the highest yielding plants you can put into a mixture.

Let's assume that we start with a mixture of alfalfa 8 pounds per acre and brome grass 8 pounds per acre. In this mixture you may now substitute other legumes and grasses for part of the alfalfa or part of the brome without decreasing the yield and you may improve it to quite an extent.

In this list are shown some of the substitutions which might be made in rotation pasture mixtures using alfalfa-brome base (in pounds per acre).

1. Alfalfa 8 lbs., brome grass 8 lbs.
2. Alfalfa 5 lbs., red clover 3 lbs., brome grass 8 lbs.
3. Alfalfa 5 lbs., red clover 2 lbs., alsike clover 1 lb., brome grass 8 lbs.
4. Alfalfa 5 lbs., red clover 2 lbs., ladino clover 1 lb., brome grass 5 lbs., meadow fescue 3 lbs.
5. Alfalfa 5 lbs., red clover 2 lbs., alsike clover 1 lb., brome grass 6 lbs., timothy 2 lbs.

Why Substitute for Alfalfa and Brome?

Now the question might be raised, "Why substitute for part of the alfalfa and brome grass if these two are so good?" The answer is that these two pasture plants have some shortcomings which you can overcome partially by using other pasture plants.

Alfalfa, for instance, kills out in low-lying areas. This deficiency can be overcome by the substitution of alsike clover or ladino clover, for both will grow well on heavy, moist soils. Ladino clover is somewhat limited in its use for this purpose because it is not as winter-hardy as alsike clover. It usually comes through the first winter but kills out the second winter. In the western half of Minnesota it has been of very little value.

The shortcoming of brome grass is that it sometimes does not develop fast enough to give enough grass during the first production year. This may be corrected by substituting part of the brome with a quick-growing grass like meadow fescue or timothy, as shown in mixtures 4 and 5 in the list above. A shortage of grass during the first production year may result in bloat trouble. Better stands from brome can be obtained by drilling the brome mixed with grain into a cultipacked seedbed. This prevents the drill from sinking too deep and thus results in better stands.

Mixtures for Pasture Renovation

The mixtures suggested for rotation pasture are well adapted for pasture renovation. However, sweet clover at about three pounds per acre is a good substitute for part of the alfalfa in a basic alfalfa-brome mixture for pasture renovation areas. Sweet clover gives good production during the first year after seeding and then leaves a brushy stubble which tends to hold the snow.

Birdsfoot trefoil is a new legume that is finding favor for pasture renovation in different parts of the country. One good quality of birdsfoot trefoil is that it will stand grazing better than alfalfa. Also, it is winter-hardy, will not cause bloat, and once established will remain almost indefinitely.

Balanced against these good qualities are its drawbacks: seedlings are weak and stands are hard to establish; growth starts late in the spring and recovery after grazing or cutting is slow; it will not yield as much as alfalfa and brome grass.

If you want to try it for pasture renovation, two alternatives are possible. Either plant with a long-lived productive mixture such as alfalfa-brome or a short-lived mixture such as red clover-meadow fescue. In the first mixture birdsfoot trefoil will not contribute much to the pasture for several years while the alfalfa is present, but high production will be obtained from the alfalfa-brome. In the second mixture good production is obtained the year after seeding from the red clover and meadow fescue, but after that most of the production must come from the birdsfoot trefoil.

Suggested seeding rates for the two mixtures are given in pounds per acre:

1. Alfalfa 5 lbs., birdsfoot trefoil 3 lbs., brome 8 lbs.
2. Red clover 5 lbs., birdsfoot trefoil 3-5 lbs., meadow fescue 8 lbs.

In the first mixture vigorous competition of the alfalfa and brome grass will hold back full development of the birdsfoot trefoil for a number of years. In the second mixture the lesser competition of the red clover and meadow fescue, coupled with their shorter life, will give the birdsfoot maximum opportunity for development.

* Associate Professor of Agronomy and Plant Genetics, University of Minnesota.

Varieties Added . . . . .

(Continued from page 2)

The trials made by the experiment stations and the two days' conference are of little value unless they are helpful to seed growers and farmers. While new varieties that have not been tested, often are introduced in carload lots and some of these may prove valuable in our state, the chances are pretty good that selections from the recommended variety list will prove of much greater value than over-exploited, untested varieties. Experiment station workers hope farmers will familarize themselves with the information available before selecting varieties to grow this year.

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PAUL E. MILLER, Director

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