

University of Minnesota Agricultural Extension Service, St. Paul

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Several Changes Made for 1958 in New Crop Variety List

W. M. MYERS*

The list of field crop varieties recommended by the Minnesota Agricultural Experiment Station was revised recently at the annual Conference on Varietal Recommendation.

Varieties that will appear for the first time on the recommended list include Minhafer oats, Forrest barley, Bolley flax, and Dollard red clover.

Minhafer and Forrest were authorized for naming and release a year ago but were not included in last year's revision of Extension Folder 22, "Varieties of Farm Crops," because seed was not generally available and because of arrangements for simultaneous release with co-operating states.

Bolley, released by North Dakota, also was authorized for recommendation last year but was not officially released or named in time for inclusion in Folder 22 for 1957.

Dollard was approved by the Conference two years ago but was withheld from the printed list of recommended varieties until adequate seed was available. As a result of seed increase in the west in cooperation with the National Foundation Seed Project, there was a large production of certified seed of Dollard in 1957. There should be an adequate supply for Minnesota forage plantings next spring.

Several varieties that have been listed as "not adequately tested" were moved to the "not recommended" list. These include Conley bread wheat; Towner and Yuma durum; Beedee, Bentland, Clarion, Fayette, Logan, Newton, Putnam and Ransom oats; Dominant, King's II, and Von Rumker rye; OAC 181 field peas; and DuPuits and Socheville alfalfa.

Finally, five varieties were moved from the "recommended" to the "not recommended" list. Two of these were Ladak and Narragansett alfalfa. This action was taken primarily because of the generally inadequate and uncertain supplies of seed of these varieties. Both are good yielding, winterhardy varieties. Neither, however, is superior in these respects to Vernal of which there is now an adequate supply of certified seed.

Fox and Montcalm barley and Minturki winter wheat were also moved to the "not recommended" list.

What Are Recommended Varieties?

Each year the Minnesota Agricultural Experiment Station conducts tests of recommended varieties, a few important old varieties, and promising new varieties developed in its own breeding programs and in breeding programs of other experiment stations in the United States and Canada. Trials are conducted at the Agricultural Experiment Stations at St. Paul, Rosemount, Waseca, Morris, Crookston, Grand Rapids, and Duluth and in farmers' fields in southwestern Minnesota, northern Minnesota, and other areas of the state.

At each location, replicated field plots are grown and handled so that factors affecting yield and other characters are as nearly as possible the same for all varieties. Thus, within limits that can be determined by the scientists who have charge of the tests, differences that are found between varieties can be attributed to the varieties themselves rather than to soil fertility or other factors. Since varieties may perform differently in comparison with one another in different years, each variety is usually evaluated in these carefully controlled tests for at least 3 years.

Folder Gives Complete Story on Crop Varieties

Minnesota Agricultural Extension Folder 22, "1958 Varieties of Farm Crops," gives a complete summary of all crops which are recommended, not adequately tested, or not recommended. For copies, see your local County Extension Office; or write to the Bulletin Room, University of Minnesota, Institute of Agriculture, St. Paul 1.

While the field-plot tests of yield, standing ability, winterhardiness, disease resistance, and other characteristics of the varieties are in progress, tests are also conducted in the greenhouses and in special disease gardens at St. Paul. In crops in which market quality is important, this factor is likewise being measured for each variety by special laboratory technics.

Finally, after a period of adequate testing (usually a minimum of 3 years) all of the information on each variety is compared by members of the Varietal Recommendations Conference—a group of University scientists at St. Paul and at branch stations—with information on other varieties. If a new variety is found to be superior to the recommended varieties in one or more important characteristics and not significantly inferior in any important characteristic, it is added to the recommended list. On the other hand, varieties are removed from the recommended list when they become unsatisfactory for any reason or when new varieties become available that are superior to them.

Varieties that have been released by experiment stations in other states or Canada or that are brought into Minnesota from other sources are listed as

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Fertilizer Use in Minnesota Continues to Increase

W. P. MARTIN and C. J. OVERDAHL

Fertilizer use in Minnesota is still increasing, according to figures just released by the State Feed and Fertilizer Control Office. The total tonnage is fast approaching the half million mark and at 414,140 tons represents a gain of 15 percent over last year.

Substantial gains of "straight" materials like anhydrous ammonia or nitrogen solutions, superphosphates, and even muriate of potash over mixed grades like 4-16-16 and 6-24-12 are recorded. Straight materials gained 21 percent during the past year and mixed fertilizers only 13 percent. Mixed fertilizers, however, still accounted for 81 percent of the total tonnage used.

The trend towards high-analysis fertilizers continues. This is indicated by the increasing use of straight materials noted above. In addition, the total plant food nutrients in all fertilizers used is now over 40 percent in comparison with 27 percent, the state allowable minimum, just 10 years ago.

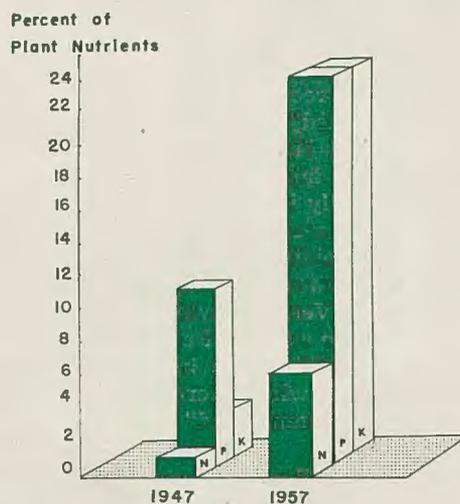
The most popular grades in mixed fertilizers are 5-20-20 at 87,000 tons; 6-24-12 at 67,000 tons; 8-24-12 and 0-20-20 at 17,000 tons each; and 4-16-16 and 8-16-16 at approximately 15,000 tons each. In contrast, the most popular grades ten years ago were 2-12-6, 4-24-12, and 3-12-12. This trend is expected to go even higher since materials such as 6-24-24, replacing 5-20-20 or 4-16-16, are now on the market.

Purchase of fertilizer for fall application is also increasing. Ninety thousand tons, or 21 percent of the total, was used in the fall of 1956, and 324 thousand tons in the spring of 1957. Only 17 percent of the fertilizer used in Minnesota the preceding year was for fall applications.

The individual plant nutrients used on Minnesota crops are also showing some change. The ratio of nitrogen to phosphate to potash is now about 1-2-1, whereas it was 1-11-4 ten years ago. In other words, nitrogen (especially) and potash are increasing in use faster than is phosphate. Nitrogen, in fact, has increased over 600 percent since 1950, potash about 250 percent.

Even with present gains, the fertilizer used is still far short of the amounts needed for replacement of plant nutrients removed from the soil in harvested

crops or animal products. Several times as much fertilizer could be used to advantage for this purpose. Only about half of Minnesota's 165,000 farmers are using any commercial fertilizer at all, with most of it going on corn. But of the total corn acreage planted in 1956, only 55 percent received fertilizer. Other crops could be profitably fertilized. The average fertilizer use on corn land in 1956 was 13-31-20, which is very low.



Comparative volumes of N P and K in 1947 with analysis commonly available at present time.

This upward trend in fertilizer use in Minnesota has been influenced by the farmer's increasing awareness that fertilizer is one of the best weapons against the cost-price squeeze. Fertilizer has remained on a low-cost basis in contrast with most of the other farm production items.

Farm real estate taxes have risen 56 percent in the past 10 years and land and machinery prices are up 40 percent. Wage rates and building supplies are 28 percent higher and mortgage interest rates are up 10 percent. Fertilizer prices have risen only about 6 percent, according to the Middle West Soil Improvement Committee.

Fertilizer also helps cut crop production costs and makes for greater production efficiency. When costs go down, profits go up and, by increasing the acre yield, profit margins are substantially higher. Fertilizer on Minnesota soils has often returned as much as \$3 to \$5 in increased crop value for every \$1 invested in plant food nutrients.

MINNESOTA FEED SERVICE

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Feed Service Committee—Cora Cooke, chairman; Rodney Briggs; William Flemming; Lester Hanson; Hal Routh; Harold Searles; Charles Simkins and Harold B. Swanson. Earl Brigham, editorial assistant for the committee.

The upward trend in fertilizer use in Minnesota has also been influenced particularly by the rapidly increasing number of soil tests. In 1956, the soil testing laboratory handled over 20,000 samples; the number had already gone over that by November of 1957. The fertilizer recommendations in the field are handled by the County Agricultural Agents.

"Miracle Claims" For Soil Treating Should Be Discounted

C. J. OVERDAHL

Minnesota farmers have been warned to watch out for "wonder" products which salemen may try to sell this winter for producing "magical" yield increases.

Some so-called "soil conditioners" and other materials are being sold by itinerant salesmen, in Minnesota, under claims that the materials contain miracle-producing ingredients. Such materials are seldom sold by well-established fertilizer dealers but are more often peddled by someone trying a get-rich-quick scheme.

A real "soil conditioner" is a synthetic chemical which does have definite value for maintaining good soil structure. But the term has become used to apply to several specialty products sold in Minnesota.

So caution should be the password whenever you're approached with a material which in small amounts is supposed to "double or triple" yields. Check with your county agent before buying if you have a question about the truth of such claims.

* Professor and Head, Department of Soils, and Extension Soils Specialist, respectively.

A NEW LOOK AT SORGHUM

AS A CROP—

Some Minnesota farmers are growing grain sorghum and many others are interested in growing it on land diverted from corn by the government farm program. Their question is: "Will grain sorghum be a good substitute for corn on my farm?" Until now, our answer has been "No" and our data strongly support this answer. (See Agronomy Fact Sheet No. 6 which is available from your County Agricultural Agent or from the Bulletin Room, University of Minnesota, St. Paul 1). Corn yielded more than 25 bushels per acre over Norghum and Reliance grain sorghum varieties in 1953-55 trials in southwestern Minnesota.

Although grain sorghum is more heat- and drought-resistant than corn, it requires a warm soil and long growing season. The warm soil requirement means that it shouldn't be planted before the last week in May—yet planting can't be delayed too long into June or it won't mature before frost. Prolonged periods of cool weather after planting and during the first month of growth result in poor stands, slow growth, and a severe weed problem.

In the sorghum vs. corn trials referred to in the opening paragraph, tractor-cultivation was sufficient to keep weeds reasonably well controlled in corn. In sorghum, additional hand work was frequently necessary. It is more difficult to cultivate sorghum than corn because the very small seedlings are easily covered by soil moved by the cultivator shovels.

Marketing and storage are major problems because sorghum will rarely dry in the field down to the maximum of 15 percent moisture required for No. 2 grade or the 12 percent that is frequently quoted as the maximum for safe storage of large quantities. If allowed to stand in the field too long after freeze-up, the stalks break over thus making combine harvesting losses excessive.

The government loan rate is \$1.73 per 100 pounds in Minnesota for sorghum of at least No. 4 grade and containing a maximum of 13 percent moisture. Thus, artificial drying is generally required for sorghum to be disposed of in government or commercial channels.

Some outstanding new hybrids have been developed, but they are all later-maturing than Reliance, which is about right for Southern Minnesota. Early-maturing hybrids are needed for Minnesota. Recent developments in chemical

weed control indicate that the weedy grass problem in sorghum may soon be solved.

New hybrids and cheap chemical weed control may make grain sorghum a good second choice crop to corn in Southern Minnesota, but at present soybeans are probably a better alternative.

—R. G. Robinson, Assistant Professor of Agronomy, and W. F. Hueg, Extension Agronomist

FOR FEEDING—

Beef Cattle and Swine

Grain sorghums, like cereal grains, are used as energy feeds for beef cattle and swine. It is generally considered that the grain sorghums are worth 90 to 95 percent as much per pound as No. 2 yellow corn is for the above classes of livestock.

Sorghum grain contains approximately 10.9 percent of protein compared to 8.7 percent of protein in No. 2 yellow corn. There is little difference in total digestible nutrients, fat, fiber and mineral content of the two grains. The grain sorghums are practically devoid of vitamin A activity but do contain more pantothenic acid than corn.

There is little difference in quality of protein, with the exception that grain sorghum contains nearly enough tryptophan to meet the needs of swine. In the formulation of swine rations complete advantage can be taken of the increased protein content of sorghums only if protein supplemental feeds which are good sources of lysine and methionine are used. Tankage and fish meal are protein supplemental feeds of this nature.

The use of less protein supplement could result in a lower cost swine ration. However, a slight additional cost will be incurred by the necessity of adding a vitamin A supplement. Little, if any, difference in ration cost would result from differences in grain sorghum and corn content of the other vitamins and minerals.

When grain sorghums are self-fed to swine they can be fed whole. However, they should be ground if they are to be hand-fed. Likewise, best results will result from grinding grain sorghums for beef cattle.

Advantage can be taken of the increased protein content of grain sorghums when they are fed to beef cattle because of the action of the rumen organisms upon intact protein. The major consideration in the feeding of these grains to beef cattle is that they

either receive adequate vitamin A from other ration components, that they have adequate vitamin A storage, or that the ration be supplemented with vitamin A.

Thus, grain sorghums and corn are interchangeable in rations of beef cattle and swine when consideration is given to the nutrient contributions of each feed.

The ability to take advantage of the increased protein content of grain sorghums of good quality should enable swine and beef cattle producers to produce 100 pounds of gain at little, if any, more total cost than that which would result from the use of No. 2 yellow corn as the main energy source.

—R. J. Meade, Associate Professor of Animal Husbandry

Dairy Cattle

Sorghum, like corn, produces both forage and grain and is an excellent source of livestock feed. Sweet sorghum or sorgo is bred to produce forage, while grain sorghum is noted for its ability to produce seed. The proportion of seed to total plant in grain sorghums is similar to corn, while sweet sorghums have a larger portion of forage.

Both types may be used as livestock feed. Grain sorghum silage more nearly approaches corn silage in its makeup, but sweet sorghum also can be used for silage. Many prefer sweet sorghum for livestock feed as the forage is more palatable. Sorghum may be used as fodder or silage. Greater yields of TDN are realized per acre when it is put up as silage. Sorghum silage could be made as the grain hardens.

The energy content (TDN) of sorghum silage is somewhat lower than corn, because there is a smaller proportion of grain in it and the grain passes through the animal in greater amounts. Sorghum forage needs to be supplemented much the same as corn silage to make a complete ration for dairy cows. Legume hay and a protein-rich concentrate do much to accomplish this.

Sorghum does not make a good crop to pasture or "soil off," since the fresh green material may contain dangerous amounts of prussic acid. After the material has been placed in storage, it is considered safe.

The grain from sorghum may be used as a substitute for corn. It should be crushed or ground for use with adult cattle. Grain from sweet sorghum varieties may be bitter and for this reason should not be fed too heavily.

—J. D. Donker, Associate Professor of Dairy Husbandry

Relationships of Energy and Protein in Growing Turkeys

C. W. CARLSON*

Larger-size turkeys eat about three-fourths of their total feed requirement during the last half of the growing period. Since the most emphasis has been given to the turkey's nutritive requirements up to 8-10 weeks of age, there is a real need for more information on their nutritive requirements during this latter period. Much of the fundamental information used today in making recommendations for and in formulating turkey feeds for this latter period, has been taken from work conducted with chickens.

Some information is available on feeding systems for turkeys during this period, in particular on the use of varied proportions of mash and various single grains or grain combinations. When given a free choice of mash and grain, turkeys will consume increasing proportions of grain as they get older. Most recommendations for protein and energy requirements are based upon these observations, i.e., the protein requirement drops and the energy requirement increases.

Recent results from our South Dakota Experiment Station work have indicated that during the 12- to 20-week period, energy levels may vary quite widely without affecting the rate of growth. The most economical growth rates during these later tests, however, have been with the higher energy feeds.

In considering oats versus corn as the primary source of energy, oats is the cereal of choice, **only when its cost is less than 70 percent by weight, of that of corn.** During this 12- to 20-week period also, protein levels of 19 percent have been indicated as being the most satisfactory. Though direct comparisons from the same experiment are not too conclusive in this regard, growth rates in later studies where 19 percent protein pelleted diets were used far exceeded that obtained earlier with 16 percent protein all-mash diets. Better starter diets and pelleted grower diets probably accounted for much of this difference, but protein level must have an important part. High-energy 19 percent protein diets with a Calorie-protein ratio of 45:1 gave only slightly better growth rates than low energy 19 percent protein diets with a C/P ratio of 35:1 in these later studies.

* Professor of Poultry Husbandry, South Dakota State College. This article is condensed from a paper presented at the 1957 Animal Nutrition Short Course.

For the 20- to 24-week period the data show that the protein content of the ration can be dropped to as low as 14 percent with satisfactory results. Studies in which the C/P ratios were increased from 45:1 to 60:1 and 70:1 continued to show slightly better growth rates than those in which the C/P ratios were increased from 35:1 to 43:1 and 53:1 during this period.

This work also indicates that the energy content should be increased still higher during the finishing period. A diet with a C/P ratio of 80:1 gave growth superior to that obtained before on a 60:1 C/P ratio and also superior to the diet in the same study with a 63:1 C/P ratio. Finish was also much improved by the wider C/P ratio.

Further work is necessary to clearly establish what the optimum C/P ratios and protein levels should be for growing turkeys from 12 weeks of age to market size. On the basis of this work it is suggested that 19 percent protein diets be used to at least 18-20 weeks of age, with energy levels between 700 and 900 Calories per pound.

The choice of energy level depends upon the relative cost of ingredients and their relative efficiency of production. From 20 weeks and on, protein content can be dropped to 14 percent or possibly less, and the higher energy levels of from 900 to 1000 Calories per pound should be used for maximum growth rate, feed efficiency, and development of finish. Thus oats or other low-energy ingredients may be used extensively during the 12- to 18 or 20-week period, but some corn or milo or other higher energy source must be used during the finishing period.

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THE NITROGEN CONFERENCE for Minnesota and the Upper Midwest, co-sponsored by the Middle West Soil Improvement Committee and the University Soils Department, will be held in the Lowry Hotel, St. Paul, February 20-22.

1958 VARIETY LIST

(Continued from page 1)

"not adequately tested" until the normal testing period has been completed or until evidence is obtained that proves them unsuitable for use in Minnesota.

Thus, the Minnesota Agricultural Experiment Station places varieties in three classes: Recommended, not adequately tested, and not recommended.

1958 Recommended Varieties

The recommended varieties for 1958 by crops follows:

Wheat—Lee and Selkirk spring bread wheat, Langdon and Ramsey durum, and Minter winter wheat. **Oats**—Ajax, Andrew, Branch, Garry, Minhafer, Minland, Rodney, and Sauk. **Barley**—Kindred, Traill, and Forrest. Peatland and Vantage for feed only.

Rye—Adams and Caribou. **Flax**—Marine, Bolley, B5128, and Redwood. **Soybeans**—Acme, Flambeau, Capital, Grant, Norchief, Ottawa Mandarin, Chippewa, Renville, Blackhawk, and Harosoy.

Alfalfa—Vernal and Ranger. **Red Clover**—Dollard, Midland, and Wegener. **Biennial Sweetclover**—Madrid and Evergreen. **Bromegrass**—Achenbach, Fischer, and Lincoln. **Birdsfoot Trefoil**—Empire. **Sudangrass**—Piper. **Timothy**—Itasca and Lorain. **Kentucky Bluegrass**—Park. **Sunflowers**—Advance and Arrowhead. **Field Peas**—Dashaway and Chancellor.

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