harmful. In such cases the plants are less hardy and more easily attacked by diseases; in addition, maturity may be delayed to such an extent as to decrease the yield through injuries by frost. If the crops have sufficient time to develop to maturity, an extra large production of foliage may not be harmful because the surplus food materials are largely transported to the seeds or other storage organs. These remarks, of course, do not apply for crops grown for their leaves.

The practices to be followed in the application of nitrogenous fertilizers should conform with the ideas presented above. Nitrogen is needed particularly for early growth; hence, it should be applied to spring-sown crops chiefly at the time of planting. In the case of cabbage, lettuce, hay crops, and other crops grown for their foliage the rate of application may be relatively high. If the growth period for such crops is short, one application may be sufficient; otherwise subsequent top dressings may be profitable. Where a continuous growth of succulent leaves is desired, as in the case of pastures, frequent applications are advisable if economically feasible.

Nitrogen for Small-Grain Crops

Where nitrogen is needed in moderate amounts, as for grain crops, early single applications are most commonly used. This application should be made at about the time of seeding for corn; small-grain crops usually respond best to early spring applications, but this will vary with the crop, time of sowing, available moisture, and numerous other factors. It is always wise to consider the fertilization program in relation to the available soil-nitrogen supply. In the early spring this supply is very low, but as the soil warms up the organic matter is gradually converted into nitrates. In the better soils this nitrate supply is usually adequate to care for the crop demands throughout the hot summer months. It is during the early spring months that this natural supply is very deficient, and this explains why market gardeners commonly secure such excellent results with heavy applications of nitrates in the early spring. Whatever the practice followed, so far as nitrogen is concerned, it is necessary to bear in mind that most soils also require phosphorus and potash; hence a complete fertilizer is usually more profitable than nitrogen alone.

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Oats of Fulghum Variety Win Place in Southern States

Most oat varieties grown in the United States have been introduced from foreign countries or have originated as selections from introductions. The Fulghum variety, however, is the one outstanding exception. It is distinctly American in that no variety like it is known in any other country.

The variety originated a few decades ago as a plant selection from a field of Red Rustproof on the farm of J. A. Fulghum near Warrenton, Ga. It probably resulted from a natural cross between Red Rustproof and some other variety. Such field crosses are not uncommon. From this beginning Fulghum has spread throughout the southern half of the United States and become one of the most important varieties.

Fulghum was first grown as a fall-sown variety in southeastern Georgia. It did not become of importance as a spring-sown variety until about 1920. In recent years it has attained its greatest usefulness for spring seeding in that area lying between the great spring-oat belt of the North and the winter-oat belt of the South. Fulghum has proved so well adapted as a spring-sown variety in this area that a new and rather definite oat belt is indicated. Growing this variety has made oats a much more certain crop than formerly in this area.

Fulghum, like Red Rustproof, is a so-called red oat. Red oats usually are considered to be descendants of the wild red oat (*Avena sterilis* L.), which is supposed to have originated in the Mediterranean region of southern Europe. Wild red oats still may be found growing in that portion of Europe and in northern Africa. This offers an explanation for the suitability of cultivated varieties of red oats to the southern portion of the United States.

Fulghum differs from Red Rustproof in being from a week to 10 days earlier. Fulghum usually grows a little taller than Red Rustproof and produces slenderer kernels with fewer awns and basal hairs. The peculiar horseshoe-shaped cavity at the base of the kernels also is not so large nor so prominent in Fulghum as in Red Rustproof. In the field Fulghum is readily distinguished from Red Rustproof by having more erect panicles (heads). They are small to mid-sized, spreading, and very erect.

Former Varieties Not as Well Adapted

In the area where Fulghum has become the important spring-sown variety the spring seasons often are short and cool. However, sudden changes to excessively hot weather frequently occur, even early in the season. Oats are more susceptible to heat injury than are other small grains, and often are seriously injured by such decided changes. An early, vigorous, and heat-tolerant variety such as Fulghum, therefore, is valuable. Previous to the advent of Fulghum for spring seeding in this area the farmers grew such varieties as Burt (also known as Early Ripe, June, May, etc.), Red Rustproof (Red Texas, Texas Red), or some of the early northern varieties, which are better adapted farther north in the Corn Belt.

Burt, while early and heat resisting, never was entirely satisfactory because of its lack of uniformity. It contains an unusual number of off-type plants, many of which are undesirable. Burt has rather small, slender kernels, of various colors, and usually also is inferior to Fulghum in bushel weight and yield.

The Red Rustproof variety usually is too late for best results in Missouri, Kansas, and Oklahoma. In Kansas, especially, it was grown for many years from spring seeding for want of a better adapted variety. Owing to its late maturity, yields often were reduced by dry weather or other unfavorable conditions. Red Rustproof has not been satisfactory for spring seeding in the territory in which Fulghum has become the dominant variety.

The northern or common oat varieties never were altogether satisfactory in the southern part of the Corn Belt. In seasons when cool weather continued until well into the spring fair yields were obtained, but slightly delayed seeding or early hot weather often resulted in light, poorly filled grain.

Fulghum and Its Strains Replace Other Varieties

The acreage devoted to oats in the principal red-oat producing States was about 8,000,000 acres, according to the 1919 census. It is estimated that probably 5,000,000 acres were of spring-sown red-oat varieties. Since 1919 the acreage sown to red oats has increased considerably in Kentucky, Missouri, and Kansas, and in the southern parts of Ohio, Indiana, and Illinois. It now is estimated that upward of 7,000,000 acres are devoted to spring-sown red oats. A large percentage of these are Fulghum or its strains, of which Kanota is one of the most important.

The possibilities of Fulghum for spring seeding were first recognized by the Kansas Agricultural Experiment Station, where the strain later named Kanota showed considerable promise in the early experiments conducted by that station. Kanota was first distributed to farmers of Kansas in 1919, and in 1926 it was estimated that over 1,000,000 acres of the variety were grown in Kansas alone. Fulghum or Kanota also is grown rather extensively in Missouri, Oklahoma, and northern Texas, and to some extent in the southern parts of Ohio, Indiana, and Illinois, Iowa, and Nebraska, and in eastern Colorado.

Frazier is another strain of Fulghum. It was developed at substation No. 6, Denton, Tex., by the Texas Agricultural Experiment Station for February seeding in northern Texas. Frazier is very similar to the original Fulghum, but usually produces more awns than the parent variety.

Disadvantages of Fulghum

Although the discovery of the value of Fulghum for spring seeding has proved of economic value to oat growers in the central spring-sown red-oat area, the variety has several deficiencies.

So far no strain of Fulghum has been found which resists stem rust (*Puccinia graminis avenae*), and none which has given evidence of resistance to crown rust (*P. coronata*). Practically every year both rusts influence oat yields in the area. Formerly it was believed that Fulghum was resistant to, if not immune from, the loose smut (*Ustilago avenae*) and covered smut (*U. levis*) of oats. Recently it has been discovered that Fulghum is not resistant to all physiological strains of these smuts. Efforts are being made by the United States Department of Agriculture, in cooperation with several of the State agricultural experiment stations, to develop strains of Fulghum resistant to these diseases.

Satisfactory control of smuts may be accomplished rather easily by treating the seed with formaldehyde.

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PAPAYA Growing in South Florida Has Made Some Headway

If you are weary of the routine of grapefruit or orange juice with your breakfast and have a taste for adventure, you might ask your fruit man at the market for a papaya. He may look puzzled and protest there is no such fruit, but he should know better and recognize that the tropical papaya is an admirable substitute for the melons that it somewhat resembles and a pleasant variation from the citrus fruits.