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# SHALLU, OR "EGYPTIAN WHEAT"

A LATE-MATURING VARIETY OF SORGHUM

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**S**HALLU is a late-maturing variety of sorghum which has been exploited under many names, most recently as "Egyptian wheat" and "Mexican Desert wheat corn." Its value has been misrepresented greatly and the seed has been sold at much higher prices than it is really worth.

Shallu was imported from India about 1890 under the name "Egyptian wheat" by the Louisiana Agricultural Experiment Station. It has since been distributed rather widely, particularly in the southern Great Plains. It requires from 125 to 140 days to mature, and because of its late maturity is more likely to be injured by drought than the earlier varieties of kafir and milo. The large, open heads are attractive when filled with ripe grain and give the appearance of producing high yields. Under the most favorable dry-land conditions, however, the yields are lower than those of kafir and milo, and in unfavorable years shallu often fails entirely. In addition, the stalks are slender and easily blown down by storms, making the crop difficult to harvest.

Shallu is not a dependable dry-land grain crop for Kansas, Oklahoma, New Mexico, and Texas and can not be recommended where milo and kafir can be grown successfully.

# SHALLU, OR "EGYPTIAN WHEAT:"

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### A GRAIN FREQUENTLY EXPLOITED.

Many varieties of sorghum have been introduced into the United States in the past 30 or 40 years. Some of these have proved valuable under dry-land conditions in the southern Great Plains, either for grain or forage or as combined grain and forage crops, while others have little value for any purpose. Large, late varieties generally can not be depended on for grain production in this section, because of the short and often partly unfavorable growing season. Early and midseason varieties of dwarf or medium growth give the best results.

Shallu is one of the introductions which are not adapted to dry-land conditions.<sup>1</sup> It is a variety that requires a long, favorable season to mature. For this reason shallu is not as dependable a grain crop as milo,<sup>2</sup> feterita,<sup>3</sup> or early varieties of kafir.<sup>4</sup> The large, open heads of shallu present an attractive appearance when filled with ripe grain. Because of this fact the variety is readily exploited, and the seed has been offered for sale by unscrupulous persons at exorbitant prices. During the last few years shallu has been exploited and much misrepresented under the name "Egyptian wheat."

This bulletin is intended for farmers who are interested in the growing of grain-sorghum crops. It applies to the southern Great Plains under dry-land conditions. It records the results obtained

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<sup>1</sup> Ball, C. R. Three much-misrepresented sorghums. U. S. Dept. Agr., Bur. Plant Indus. Circ. 50, p. 3-10. 1 fig. 1910.

<sup>2</sup> Ball, C. R., and Leidigh, A. H. Milo as a dry-land grain crop. U. S. Dept. Agr., Farmers' Bul. 322, 23 p., 9 fig. 1908.

<sup>3</sup> Vinall, H. N., and Ball, C. R. Feterita, a new variety of sorghum. U. S. Dept. Agr., Bur. Plant Indus. Circ. 122, p. 25-32. 1913.

<sup>4</sup> Ball, C. R., and Rothgeb, B. E. Kafir as a grain crop. U. S. Dept. Agr., Farmers' Bul. 552, 19 p., 8 fig. 1913.

from shallu when grown under such conditions in comparison with other varieties of grain sorghum in varietal tests in Texas, Oklahoma, Kansas, and New Mexico.

#### HISTORY OF SHALLU.

The group of sorghums to which shallu belongs is commonly grown in some parts of India and East Africa, especially in central East Africa. It is distinct from any other group grown in the United States. Shallu was imported from India under the name "Egyptian wheat" by officials of the Louisiana Agricultural Experiment Station about 1890. After being grown for many years at the Louisiana stations it was discarded because inferior to kafir and milo as a grain or forage crop.

Meantime numerous small lots of the seed had been obtained by persons attracted by the new plant. In this way the variety was introduced here and there in other parts of the country, principally in Texas and Oklahoma. As early as 1905, shallu was grown in Texas under the name "California wheat." Many names have been applied to this variety and used in its exploitation since its introduction. Among them are California rice corn, California wheat, California golden sorghum, Egyptian rice, Egyptian wheat, Mexican wheat, Mexican Desert wheat corn, and rice corn. All such names are somewhat misleading.

#### DESCRIPTION OF SHALLU.

The variety of shallu grown in this country has slender stalks, the pith of which is neither juicy nor sweet. The stalks grow from 5 to 8 feet tall in the southern Great Plains, the height depending on the elevation, soil, and moisture. Shallu tillers or suckers freely. The heads (fig. 1) are large and open, wide at the base, narrow at the tip, and pale yellow in color. The long, slender branches of the heads are spreading and drooping at the tips. The leaning of the slender stems as the crop matures often causes all the branches to hang to one side of the central stem. The greenish yellow hulls, or glumes, closely envelop the young seed. As the seed ripens, however, these glumes turn to a pale straw color and open widely, completely exposing it. The ovoid, somewhat flattened seeds are whitish to pale buff and are slightly smaller than kafir seeds.

#### YIELD OF SHALLU.

Shallu has been included in varietal experiments in different parts of Texas and in Oklahoma, Kansas, and New Mexico. These tests were conducted under dry-land conditions without irrigation. The yields obtained show very plainly that shallu is not as dependable a crop as milo, kafir, or feterita in these districts or in others with

similar conditions. One head of each of these varieties of sorghum is shown in figure 2.

Experiments with shallu have been conducted at the Cereal Field Station, Amarillo, Tex., since 1905. This station has an elevation of about 3,600 feet and an average annual rainfall of about 21 inches. The highest yield of grain obtained from shallu during this 11-year period was 34.5 bushels per acre in 1915, a very favorable season. Several entire failures have been recorded, while yields in other years have ranged from 2 to 17 bushels per acre. In the year 1915 the yield from Dwarf milo was 68.4 bushels; from feterita, 46.9 bushels; and

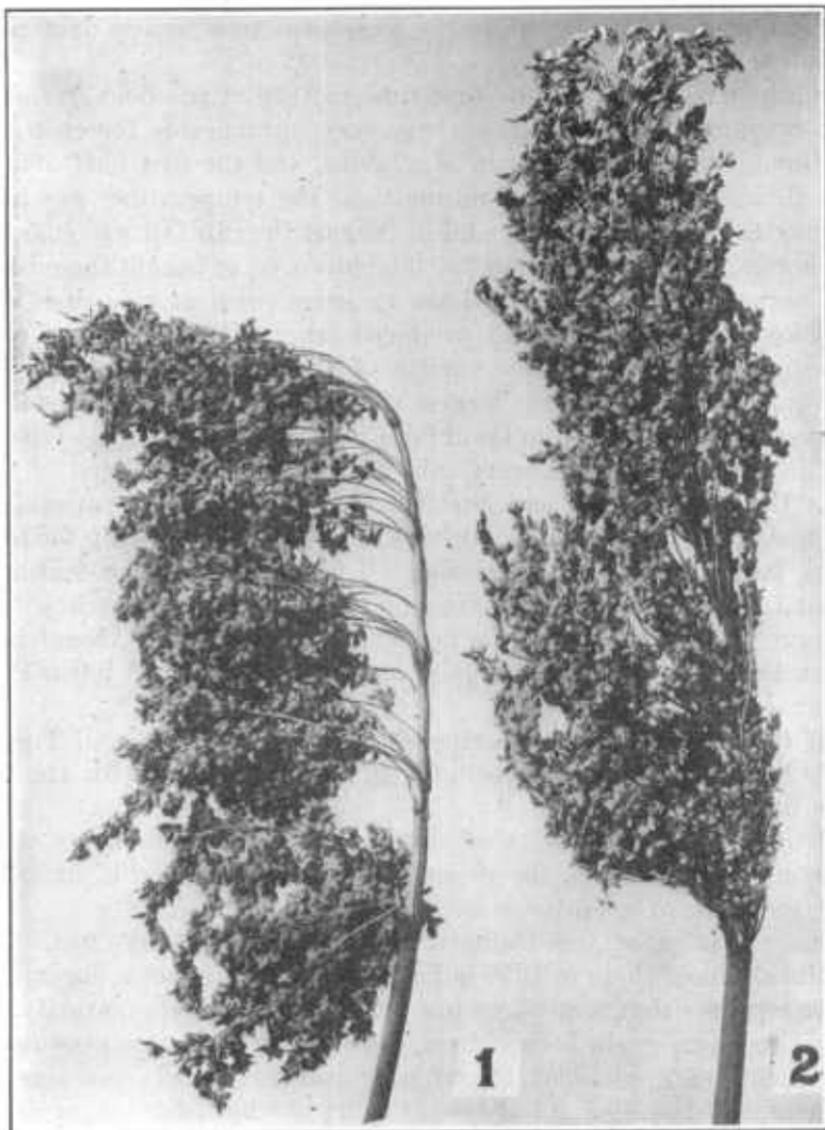


FIG. 1.—Two heads of shallu. The branches of the head at the left all droop to one side, owing to the leaning of the slender stalk.

from Dwarf kafir, 53.3 bushels. The average yields from the four varieties in the 6-year period from 1911 to 1916, inclusive, are as follows: Shallu, 10 bushels; Dwarf milo, 27.4 bushels; feterita, 21.8 bushels; and Dwarf kafir, 19.3 bushels per acre.

The results of experiments at the San Antonio Experiment Farm, San Antonio, Tex.,<sup>1</sup> show that the yield of shallu is less than that of Dwarf milo, feterita, or Dwarf kafir. This station has an elevation of about 700 feet and an average annual rainfall of about 25 inches. In this and other sections where the sorghum midge is present, shallu is likely to be damaged more than the other varieties mentioned, because of its late maturity. The midge usually does not appear in large numbers early enough in the season to cause serious damage to early varieties.

Shallu was grown for the first time in 1916 at the field station at Big Springs, Tex. The season was very unfavorable for crop production. The precipitation in May, June, and the first half of July was considerably below the normal and the temperature was high. During the last half of July and in August the rainfall was sufficient for normal growth. This was too late, however, to benefit the midseason varieties sown in May. Late varieties sown at this time were benefited by these rains and produced larger yields than the early varieties. Shallu and a late variety of Blackhull kafir each yielded 24.6 bushels to the acre, the largest yields obtained in the varietal experiment. The yield from Dwarf milo was 7.9 bushels; from feterita, 15.2 bushels; and from Dwarf kafir, 14.2 bushels to the acre.

At the Woodward Field Station, Woodward, Okla., varietal experiments with grain sorghums have been conducted during the three years from 1914 to 1916, inclusive. The elevation of the station is about 1,900 feet and the normal annual rainfall about 24 inches. The average yield of shallu in this period was 12.5 bushels; Dwarf milo, 21 bushels; feterita, 15.4 bushels; and Dwarf kafir, 20 bushels per acre.

At the field stations at Lawton, Okla., Dalhart, Tex., and Tucumcari, N. Mex., shallu was included in the varietal test for the first time in 1916.

Owing to the appearance of chinch bugs in large numbers at the Lawton Field Station, the crops were damaged to such an extent that no yields of grain were obtained.

The elevation of the Dalhart Field Station is 3,900 feet. The results obtained there in 1916 indicate that shallu is not a dependable grain crop for that section, owing primarily to its late maturity. It failed to ripen grain before frost, while other varieties produced a fair yield. The yield of Dwarf milo was 21 bushels per acre; of feterita, 16.7 bushels; and of Dwarf kafir, 13.8 bushels.

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<sup>1</sup> Ball, C. R., and Hastings, S. H. Grain-sorghum production in the San Antonio region of Texas. U. S. Dept. Agr., Bur. Plant Indus. Bul. 237, 30 p., 4 fig. 1912.

Seasonal conditions were very unfavorable for sorghum in the vicinity of Tucumcari, N. Mex., in 1916. The weather was very dry at seeding time and this condition continued far into the summer, so that only a small growth was made. The yields from all varieties, therefore, were very low. In addition to the unfavorable season the damage to some varieties by birds was considerable. Shallu did not mature, because of the dryness of the soil late in the season. The yield of Dwarf milo was 13 bushels to the acre; of feterita, 12.2 bushels; and of Dwarf kafir, 13.3 bushels.

#### UNDESIRABLE CHARACTERS OF SHALLU.

The undesirable characters of shallu which directly affect its usefulness as a grain crop for dry land are late maturity, suckering, lodging, and nonexsertion of the head. These characters are discussed in the order named.

#### LATE MATURITY.

Shallu is a late variety of grain sorghum. It requires from 125 to 140 days to mature, depending to some extent upon the elevation and seasonal conditions. Late varieties usually are affected more by drought than early and midseason varieties. The midsummer droughts check the growth of the later varieties to such an extent that when more favorable conditions arrive, they often are unable to produce a crop of grain before frost.

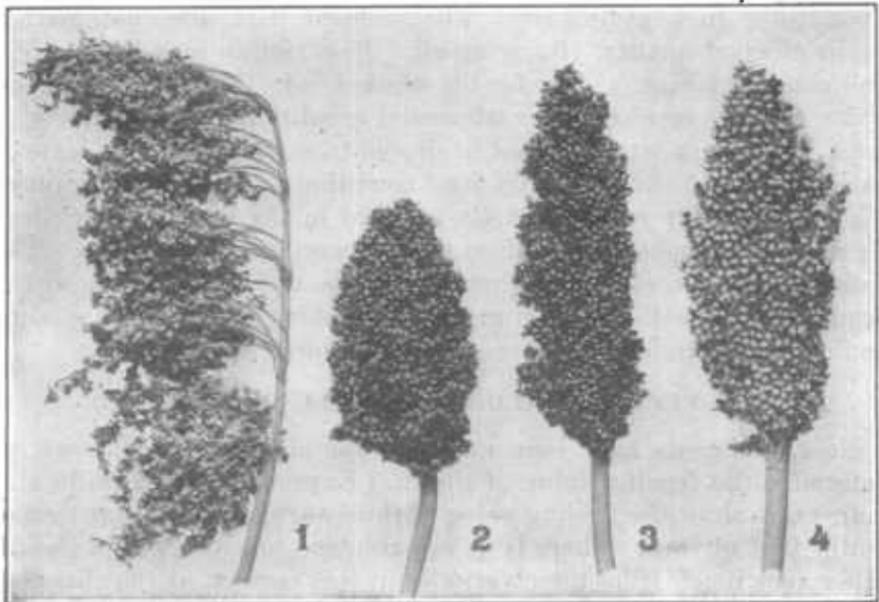


FIG. 2.—Heads of four varieties of sorghum : (1) Shallu, (2) Dwarf milo, (3) Dwarf kafir, and (4) feterita.

**SUCKERING.**

This is a common character among the sorghums, though more prevalent in some varieties than in others. Suckers are objectionable in a sorghum crop grown for grain, for the reason that they usually are much later than the main stalk, preventing the uniform ripening of the grain. Shallu produces numerous suckers, frequently as many as 8 or 10 to one plant if the stand is thin. A large number of these do not mature grain in normal seasons, and under abnormally dry conditions none of them will mature.

**LODGING.**

Strong winds are common in the sections where the grain sorghums are of economic importance. The tall, slender, and weak stalks and the large, open heads cause shallu to lodge readily during storms. A badly lodged plat of shallu is shown on the title-page. This is an end view of the plat, but the stalks have lodged to such an extent that the rows are obscured. Lodging may affect both the yield and quality of the grain, and it makes harvesting difficult and tedious. When lodging occurs before the heads are fully formed, the seed does not develop normally and a low yield is the result. If lodging occurs after the grain is well developed, much damage may be done by the heads touching the ground and the seed becoming moldy.

**NONEXERTION OF THE HEAD.**

The failure of the head to grow completely out of the boot is undesirable in a grain crop. The inclosed part does not mature grain of good quality, if any at all. This results in a lower yield and poorer average quality for the whole head. Poor exertion may occur in any variety under abnormal conditions. It naturally is most common in late varieties in droughty seasons or in unadapted varieties. In shallu under dry-land conditions, a large proportion of the heads usually remains partly inclosed in the boot or upper leaf sheath. This inclosed part often shelters worms and plant lice. The moldy, rotten, or worm-eaten mass from the inclosed portions of the heads is mixed with the good grain in thrashing, lowering its quality and causing it to heat more readily when stored in bulk.

**FEEDING VALUE OF SHALLU GRAIN.**

No experiments have been made, so far as the writer knows, to determine the feeding value of shallu. Experiments with milo and kafir grain show the feeding value of these varieties to be about nine-tenths that of corn. There is no apparent reason why shallu should differ very much from these varieties in this respect, as the chemical composition is similar.