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Science for the Farmer—III
Have we the Herbage Species?

by

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No country can take wiser action in the interests of the health and stamina of its people than to ensure that its children do not suffer for want of milk. This is just what our Governments are making frantic efforts to do, to ensure that our children do not want for milk. But so far all their measures are concerned only with improving the breed of our cattle, by providing more and better breeding bulls, artifiicial insemination, etc. But all seem to ignore the fact that the effect of better sires can easily be nullified by poor feeding. The improvement in the calves produced can be maintained only if they are fed with nutritious feeds and fodder in larger quantities than we have been finding it possible to give their mothers.

The Dutch Friesian breed was believed to be the heaviest milkers in the World. British breeders took Friesian cattle to England and so improved them that now the British Friesians are recognised as an almost distinct breed superior even to the Dutch Friesians. Breeders of this calibre, we are told, have a saying that "half the pedigree goes in at the mouth." *Pari passu* with measures to supply pedigree sires we must take steps to provide better feeds and fodders and in larger quantities, or all our efforts will be wasted.

In England and Wales in 1946 more than thirteen million acres were under permanent grass and temporary leys of cultivated grass, with an additional acreage of over two hundred thousand acres cropped with beans and peas for stock feed as against ten and a half million acres under grain and other crops. This is because Britain, being a Welfare State, prefers; in the interests of national health and economy, to produce all its requirements of liquid milk and to import foodgrains to meet its deficit in them. Fortunately for us we can aim at self-sufficiency in both liquid milk and foodgrains, for we have vast areas of cultivable waste land for grass production. Further, our acre yields of foodgrains are so low that with scientifiic methods we could double our production us: ect less arable land than at present. So in this country it is which possible to achieve self-sufficiency in both milk and foodgr··ge white

whether this is probable will depend entirely on the kind of lead our newly started extension services are going to give us farmers.

The main principles of growing forage crops and grass which are fundamental to sound farming practice are the same all over the World, but the environmental conditions in the tropics are so different from those in temperate climates that it is not feasible to put these principles into practice exactly on the lines that experience has proved to be advantageous in the United Kingdom. For instance, perennial legumes, like lucerne and the clovers of temperate climates will not thrive so well in the tropics and so far scientists in the tropics have failed to find a legume that will effectively take their place in the rotation. Scientific knowledge and research on the problem of grassland management in the tropics is still in its infancy. Such research in this country is essential, for in the words of Dr. J. B. Pole Evans: "Pastoral research, if given full scope, holds the key to the preservation of our water and soil resources, the raising of our soil fertility, the revitalisation of our agriculture, the termination of the drift from country to town, the production of more wholesome food, the creation of a more healthy people and a more contented and vigorous nation."

Attempts to grow grass, however need not wait for the results of such research, for there is enough information available, about suitable grasses for every kind of environment. Such information as is available proves that we have in this country the grass species fit for cultivation and all that the farmer need do is by actual trial choose the species, variety and strain best suited to his environment. We can proceed with confidence to make our trials and cultivate grass because we have one advantage which more than compensates for the absence of perennial legumes and the superior nutritional value of the grasses of the temperate climates. The average yield of green forage from cultivated tropical grasses will be several times that which is usually obtained from a good grass ley in England and the total yield per acre of digestible nutrients will be considerably more than is obtainable from pasturage in temperate regions with their shorter growing season and winter frosts. The protein content of tropical grasses can easily be raised to the level of the average pasture grasses of temperate regions by two simple measures well within the capacity of every farmer. One is better manuring of the forage crop. The other is the growing of grasses under the shade of leguminous trees

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because this has been found to increase the total yield of grasses grown under shade as well as the percentage of protein. In fact figures quoted in books of unquestionable authority seem to show that by growing a good tropical grass under leguminous shade, combined with good cultural treatment the protein content can be raised so as to equal, if not excel, the percentage of protein in the best temperate grasses. In support are these figures taken from Joint Publication No. 10 of the Commonwealth Agricultural Bureaux and the F. A. O. study: "Improving the world's grasslands."

Carpet or sannah grass grown under legume shade	Protein content–14%
Very good (English) meadow hay	10. 0%
Young crested wheat grass (of temperate regions)	10. 15%

From the practical farmer's point of view forage species can be divided into two classes:–

(1) Forage crops of little or no value for building up soil structure.

(2) Species which have high feeding value as well as capacity for soil aggregation.

The farmer's job is to fit both these into his farming system so as to get highest return from his land while building up its fertility and maintaining it at the highest level possible.

Under each of the above classes will be mentioned only those species which have been tried and found to grow luxuriantly on the West Coast climate on the alluvial sands of the coastal strip. These will be enongh to prove that we have the species.

Class 1.

Seasonal Forage Crops which do not affect soil aggregation; The sorghum species are nutritious forage crops which are quick-growing and yield a heavy tonnage of green forage. Of these the best for fodder is some sweet sorghum variety. Sown with the first pre-monsoon showers towards the end of May, on well-drained soil one can get two heavy cuttings by the end of October, when the dry weather kills the stubble. Usually the sweet sorghum varieties are useless for grain purposes but a variety which I brought from Wardha bears excellent ear-heads of large white

grains and its grain yield on my farm was, last season, better than the best I have obtained from the improved Coimbatore dual-purpose strains like CO. 11.

Closely allied to these cultivated sorghums there are some grass sorghums whose seed is of no value except for sowing. Of these the only important species is Sudan grass. Curiously enough Sudan grass is unimportant in Sudan itself but is greatly valued in the U. S. where it was introduced from Khartoum in 1909 and met with immediate success. We are told that from the eight ounces of seed originally imported in 1909, a crop was developed that in 1918 was worth 10,500,000 dollars. I have tried and found Sudan grass eminently suited to these well-drained but poor, sandy soils. It makes excellent hay and can also be used for silage. It can be cut and fed as green forage or grazed. On the West Coast, when sown with the pre-monsoon showers it yields at least three cuttings and sometimes four, if there are showers in November-December. Under irrigation it will live for more than a year and give six to eight cuttings depending on the manuring. It makes very rapid growth from seed and tillers profusely, the tillering being favoured by mowing. Its quick growth makes it very well adapted for use as a catch crop for hay or silage. In the U. S. the yield is stated to be over three tons of cured hay per acre. At the University Farm at Honolulu the total annual yield from eight cuttings was reported to be 49 tons an acre of green forage. When you add to all this the fact that tests at the University Farm showed that Sudan grass was the only one of several grasses (including Napier, Guinea, and Rhodes grasses) that gave significantly higher milk production you can imagine its potential value to the mixed farmer of the West Coast who has an acre or two of waste land that he does not know how to use.

In the U. S. they have developed a variety called Sweet Sudan by crossing a saccharine sorghum with Sudan grass which is said to be even better than Sudan grass, because it is more palatable, has broader leaves, larger stems and taller growth than the ordinary Sudan grass and matures later.

In spite of the potentialities of Sudan grass we are not likely to be able to get seed to enable us to grow it on any scale. Fortunately for our immediate needs we have substitutes which are not inferior to it. It seems that according to chemical analyses *Setaria italica (Tenai)* is about as nutritious as Sudan grass and Timothy, which

is by far the most extensively grown hay grass in the U. S. *Setaria italica* does better than sorghum on poor soils and stands heavy rains better. It can therefore be sown later than cholam, even when the monsoon is beginning in right earnest. Another forage crop which is not exacting in its soil and fertility requirements is *Pennisetum typhoides (Cumbu)*. The seeds of both these are cheap and only a few pounds are required to sow an acre. But in the case of *Cumbu* there is a special fodder variety which tillers profusely and can be cut repeatedly. This fodder variety should be used in preference if a purely forage crop is desired.

Both the total yield of forage and its protein content can be enormously increased by growing some legumes in association with the above-mentioned cereals. At the same time the legume roots and stubble will more than replenish the soil nitrogen used up by the forage crop. I have found two annual legumes pre-eminently suited to these poor soils. In areas which are not water-logged, cow-pea and velvet bean do well in the poorest of soils provided they contain legume nodule bacteria. On land on which legumes have never been grown it is advisable to use inoculated seed for the first sowing. This culture can be obtained from the Coimbatore Agricultural Institute and costs nothing.

I smiled a superior smile when I read that the Sudanese were so ignorant of the value of Sudan grass that they never attempted to cultivate it. But believe me, I did not feel amused and ceased to feel superior when I read about velvet bean. What I read was this :-

"The velvet been is apparently a native of India. It is said to have been introduced into Florida nearly a century ago. It was grown as an ornamental vine for porches and trellises. The velvet bean has been an important factor in the development of the live-stock industry and as a soil-improving crop. The seeds have a high feeding value and are important as a concentrated feed; the leaves and vines afford good roughage. For soil improvement, especially on sandy soils, the velvet bean is one of the best crops."

There is not the least exaggeration in the above quotation for I have been growing velvet bean for more than four years and I know. But how many fellow-countrymen of mine grow this valuable native of India ?

Cowpea likes warm weather, will stand considerable drought and tolerates shade. It is better adapted to varied soils and makes better growth under adverse conditions than most other legumes. In the U. S. it is considered so valuable a crop for human consumption as well as for hay and silage, that the annual acreage under cowpea is some three million acres. Cowpea hay analysis, on the average show a little over 16 percent of protein; mixing cowpea hay with even paddy straw would provide a maintenance ration sufficiently nutritious for our indigenous cattle to justify cutting out expenditure on cakes. I am putting into practice my conviction that in velvet bean and cowpea we have two of the finest legumes for improving poor soils and poor cattle, not to mention poor farmers as well.

Research Notes

A note on Sweet Sudan Grass

There have been frequent enquiries by a number of interested farmers as to what exactly 'Sweet Sudan' is. These enquiries have been prompted by the high praise this fodder grass has received in foreign journals and press communications. Sweet Sudan grass U. S. A. Reg. No. 92 was obtained by workers at the Texas Agricultural Experiment Station in co-operation with the U. S. Department of Agriculture. The common Sudan grass has insipid stems and to improve this important fodder grass it was crossed with a sweet-stemmed grain sorghum variety 'Leoti Sorgo'. The hybrid was crossed back to Sudan grass. Some of the plants from the progeny which were highly palatable to cattle were inter-crossed, and from the progeny suitable plants were selected. The mixture of strains has been named as 'Sweet Sudan'. The following characteristics of the plant has been extracted: (Agronomy Journal Vol. 41, 1949–page 539).

"Sweet Sudan grass is a strain that resembles the common variety but has stems that are slightly coarser, and are juicy and sweet, rather than pithy. It is slightly later in maturity, has tan plant colour, and has glumes that are sienna in colour rather than straw to black." "The desirable characteristics of Leoti Sorgo that have been incorporated into Sweet Sudan grass are: juiciness and sweetness of stem; some resistance to foliage diseases, to chinch bug and charcoal rot; sienna glume colour that allows a mechanical mixture with Johnson grass to be easily detected; high seed-producing ability; and less shattering. Sweet Sudan grass grows more slowly in the early spring than does common sudan grass but