

Fodder Crops in the Madras Presidency—A Review.

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(Continued from the previous number)

Lucerne (*Medicago sativa*.) Often termed the queen of forage crops, this is perhaps the most highly esteemed fodder in this province, as elsewhere in India. It has not, however, spread so well in Madras as in Western India; here it is still confined to the Government Farms and their neighbourhood. Though originally a native of temperate Asia (it is mentioned in the Bible) it seems able to stand the hot Indian climate very well indeed, although of course, the cuttings are heavier during the cold months of November-January than those from May-July. The crop needs a deep, well drained loam rich in lime, with adequate manuring and irrigations. Sullage water also can often be used with advantage, but soil alkalinity is fatal to its success. Being a rich feed, one or two pounds per day per animal is ample, so that in most places it need only be grown in small plots adjacent to wells. Apart from its value as a forage crop, lucerne is also reported as useful in the control of malaria. It is of course well known that malarial mosquitoes live, not only on human blood, but often feed on plant saps also. When they take in the lucerne sap, the organisms causing malaria are destroyed, rendering the mosquitoes harmless. Thus Egypt is believed to be free from malaria chiefly because lucerne is grown so extensively there. In the Argentine also, a similar thing is noted, and is corroborated by Russian workers in the Caucasus region. In Madras, lucerne was first introduced in 1916 on the Central Farm, Coimbatore, where it has ever since been a prominent and regular crop on about 2 acres. The cost of cultivation was rather high in the beginning (149 lb. per rupee in 1917, or Rs. 122 per acre) but dropped down to about 800 lb. per rupee in 1930. The average annual yield works out to 36,000 lb. in about 10 to 12 cuttings, at a cost of 425 lb. per rupee. The sale of lucerne in small bundles is a recent feature of the Coimbatore fodder supply. Attempts to introduce this crop in the Circars have not, on the whole, been very successful. At Samalkota it was tried in 1931 on a small patch and gave a calculated out-turn of 25,000 lb. but was not continued in subsequent years. At Guntur the yield was only about 650 lb. per acre, nor was it much better at Chintaladevi where the maximum itself was only 1,040 lb. At Hagari it was grown for two years (1918 and 1919) and then dropped, and resumed in 1922 from which period it has been a regular crop on about one acre. On the East Coast it has figured in a small patch of only 3 cents at Palur, but

has yielded 14,100 lb. at Tindivanam, and has been pronounced a success at Aduturai. At Hosur, lucerne was a prominent crop in the days of the Army Remount Depot for nearly fifty years, and was then popular among the ryots all round, but when this depot was closed down, lucerne cultivation in the neighbourhood also died out. It is strange how such an excellent crop could have failed to catch on with the local ryots, but probably its heavy water requirements and some difficulty in getting good seed might have contributed towards such a fade-out. On the Cattle Farm, its cultivation was naturally resumed from 1924, with an average annual acre yield of 30,220 lb. on about 4 acres each year. Attempts to introduce it on the West Coast were all failures; the heavy rainfall, coupled with the shallow lime-deficient laterite soils was probably not quite suited to this crop. It has however been a success at Koilpatti with 27,300 lb. in six cuttings for the year, and also on the Hills at Nanjanad, giving 27,400 lb. per acre per annum.

An allied crop berseem (*Trifolium alexandrinum*) was tried at the Central Farm in 1924 and at various other centres (viz., Hosur, 1928, Samalkota 1929, Anakapalle 1933, and Koilpatti 1935), but was found very much inferior in outturn, and was unable to withstand frequent cuttings like lucerne.

Pillipesara (*Phaseolus trilobus*). This is perhaps the most popular fodder and green manure legume on the deltaic tracts of Kistna and Godavari. It has also subsequently been tried and found good in other parts of the presidency as well. It is a wiry-stemmed, drought resistant plant of sprawling habit that could stand two or three cuttings and then give a fair outturn of seed as well. It is more adaptable to adverse conditions and less susceptible to insect pests than sunnhemp. At Samalkota it was tried in 1929 at different sowing periods, and sowing it in November in the standing paddy was found the best practice. The yields averaged about 15,600 lb. per acre. In the Maruteru tract, pillipesara was well known even before the advent of the Station, the ryots sowing it along with other legumes, from June onwards on field bunds kept specially wide for the purpose, and cutting it two months later. With monthly sowings on different bunds they secure a continuous supply of green forage up to the next February or March. For green manure it was more usual to sow it in November, as at Samalkota, in the standing crop of paddy, utilize the first growth for fodder upto March, and plough in the subsequent flush for the main paddy crop. It is common in this tract to top off overgrown paddy plants in September and utilize them as green fodder. Pillipesara is suggested as very suitable for mixing with these toppings and making silage. At Guntur where it was first introduced in 1927, it has given an average yield of 10,700 lb. as a punasa crop (sown in July and harvested in September), and 11,200 lb. per acre at Nandyal. A proportion of 3 parts of Jonna to 1 of pillipesara was found very suitable at Guntur and Coimbatore, for improving the feeding value of the mixed fodder without causing any appreciable

loss in either grain or fodder yield, but at Nandyal such mixtures were found to pull down the grain yields of jonna.

Curiously enough, pillipesara, although successful at Nandyal, did not fare so well at Hagari, the yields even under irrigation never exceeding 6,700 lb. per acre. On the Ongole tract in the Nellore district, it was a common dryland crop even before the Cattle Breeding Station was opened, and was of course, a regular crop on this station, giving an average outturn of 2,200 lb. green fodder from the drylands. On the East Coast, where it was introduced from the Circars in 1931, it has been reported as being quite a success. Thus, at Aduturai, it gave 16,000 lb. on the average, for the April-sown irrigated crop. Two cuttings are usually taken from this crop by November, and it is then left for seed, the pods being collected in January. The Maruteru practice of sowing in November in the standing paddy crop was tried with success here also; cholam is often mixed with pillipesara, and the first cutting utilized for fodder, the second flush being ploughed in later on for the subsequent crop of paddy. Another practice that was found successful was to grow a mixed crop of maize and pillipesara on the wet lands from June to September and utilize it both as green forage as well as a silage material. In the Mettur project area of Pattukottai, and also at Gudiyattam, pillipesara has been tried and found quite promising. It is one of the standard green manure crops on the Central Farm at Coimbatore, both in wetlands as well as garden lands. The wetland yields work out to an average of 11,000 lb. per acre at a cost of about Rs. 4. At Hosur it has figured regularly since 1929 on the drylands, with an average yield of 6,800 lb. On the West Coast and the Hills, pillipesara was found unsuitable. At Koilpatti it was first tried in 1931 and has proved a success both on the dryland black soils and the irrigated red soil area, with yields of 3,200 lb. and 18,500 lb. respectively.

Sunnhemp (*Crotalaria juncea*). This is one of the best dual-purpose legumes available in this province, coming in handy both as a fodder as well as green manure. It grows well on a wide variety of soils, but is rather badly susceptible to insect damage. In the Circars it is a common garden land green manure round about Anakapalle, often sown along with other pulses, in May and harvested by August or September. In the Ganjam district however, there is a curious prejudice, that its cultivation could be done only by certain castes, although attempts have been made at the Berhampur Rice Research Station to popularise it in the tract. In the deltaic regions, of Samalkota and Maruteru, it is usually sown in November in the standing paddy crop, along with other pulses like black gram and green gram. The pods from these are gathered in February and the sunnhemp is grazed down or cut for hay, or else sometimes ploughed in for the subsequent crop of sugarcane. It was found however, that this sowing in November did not always give a good crop, as the damage from caterpillars was often very much more severe than when grown in March under irrigation. The yields then were much heavier, averaging about 14,300 lb. per acre at Samalkota

and 15,700 lb. at Maruteru. Although sunnhemp is so popular, the seed supply has always been a problem in both these tracts. Usually the seed had to be obtained from the upland taluks, through middlemen, who often charged as much as Rs. 30 or sometimes even upto Rs. 50 per bag of 160 lb. Consequently attempts were made to produce the seed locally. It was found that by sowing sunnhemp in September on field bunds, and taking care to nip off the top shoots just before the floral buds appeared, buds were induced to form in greater profusion on the axils of leaves and a good seed crop was secured without difficulty. The cost in this case worked out only to about a rupee per 160 lb. of seed, as against Rs. 30 or Rs. 50 often charged by the middlemen. Sunnhemp has been a fair success at Guntur, yielding about 2,000 lb. of dry fodder as a rainfed crop sown in July or August. The optimum time for sowing was found by experiment to be the second week of August. It has not been so good at Hagari. There the average yield, for an irrigated crop sown in July and pitted for silage in October, has been only 6,000 lb. green fodder per acre. On the drylands at Nandyal it was a failure, although a very good yield of 26,000 lb. has been recorded one year (1925) from the wetlands of the Station. On the Ongole Cattle Farm at Chintaladevi it was a regular crop each year on about 25-30 acres, both as a pure crop as well as mixed with other cereals like *jonna* and *sajja*, and legumes like *horsegram* and *pillipesara*. The earlier July sown crops were in general better than the September sown, yielding 1900 lb. of dry fodder while the yields from December sowings were even more uncertain than the September crops. At Palur, sunnhemp is a regular green manure crop sown in June, with an average outturn of 5,100 lb. The yields have been even better at Palakuppam with 3,400 lb. dry fodder per acre, while at Aduturai, where it was first introduced in 1931, the June sown crop has yielded 16,300 lb. at a cost of 10 annas per 1000 lb. If sown in December, after the harvest of paddy, the crop was usually ruined by caterpillars, and the outturn never exceeded 1,900 lb. per acre. On the Central Farm, sunnhemp has not been very prominent as a fodder crop, owing probably to the presence of a better feed in lucerne, although it has been one of the standard green manures both in the wetlands as well as the garden and dry lands of the Farm. At Hosur however, it has been a regular fodder for hay and silage on about 10 acres each year. The average yield has been 8,600 lb. per acre. On the West Coast, it could be grown only in September as a rainfed crop on *modan* lands (hilly dry-land areas). The yield in such cases has been about 4,700 lb. per acre. As an irrigated crop in March at Pattambi, an acre yield of 10,000 lb. was recorded in one year (1932), but on the whole, sunnhemp has not been quite suited to West Coast conditions. At Koilpatti it has been regularly grown since 1931 yielding 8,700 lb. on the average as an irrigated crop in the red soil area, and used for making silage.

Cowpea. (*Vigna unguiculata* (L.) Walp). Among all the fodder legumes, cowpea seems better suited to the humid West Coast than any-

where else. In the Circars, it was found at Samalkota, to do better when sown in November amidst the standing paddy, than as an irrigated crop in February. At Maruteru, it figures along with sunnhemp and pillipesara, as one of the bund-sown fodders in paddy lands. Though grown at Guntur from 1933 till 1936, it has been only as a green manure, and never as a fodder. At Hagari, it was a failure, even with irrigations. At Chintaladevi it was a regular fodder crop in the *punasa* season as long as the farm existed, but the yields were uniformly low, averaging only 1,500 lb. green fodder per acre. At Hosur the average was 6,600 lb. Cowpea may be said to have been a success at Palur and Aduturai, with a cut of 6,400 lb. and 10,700 lb. per acre respectively, but at both these stations it was grown more for green manure than for fodder. All the same, its success or otherwise, serves as an index to its fodder possibilities as well. On the Central Farm, cowpea has not, on the whole, been very prominent, either as a fodder or as green manure. On the West Coast, however, it has been the most successful among all the legumes tried, both for green manure and as a silage material. The optimum time of sowing was from the end of May till early in June; earlier sowings resulted in the crop getting caught up in heavy rains, just at the flowering stage. On the Southern tract, cowpea was a failure on the dryland black soils of Koilpatti although under irrigation it gave up to 14,500 lb. in the red soil area.

Horsegram (*Dolichos biflorus*). This is a hardy, quick-growing pulse, sown usually on the poorest soils. It is probably the best leguminous rain-fed fodder crop for light soils, especially on those inclined to be shallow and somewhat stony. Being itself intended as a restorative crop, it is seldom, if ever, manured at all, although as Benson reported from Saidapet in 1879, it is capable of yielding as much as 10,600 lb. within about 70 days, under even moderate applications of manure to the rainfed crop. It makes excellent hay, with a very pleasant smell, although losing about 75% of its green weight on drying. On the Northern Circars, horsegram is sown broadcast in the *Peddapanta* (August—September) season at Anakapalle, following cereal crops like *Punasa* (June—July) *ragi* or *Ganti* (Cumbu). In the deltaic regions however, as at Samalkota and Maruteru, it is one of the usual pulses sown in November just before the harvest of paddy. The pods are gathered in February and the *bhusa* (residue of vines and empty pods) used for cattle feed. On the uplands, i.e., the tract between these heavy soils of the deltas and the hilly regions of the interior, horsegram is one of the chief rain-fed crops on light loams, being sown broadcast in October, after an early crop of gingelly or a cereal, and harvested by February. In Guntur also, horsegram is an important recuperative crop following tobacco in October. On the heavy blacksoils of the Ceded districts, as at Hagari, it is not so popular, although it has been grown on the farm, off and on, with an average yield of 4,800 lb. green material per acre, from rainfed crops and 8,100 lb. under irrigation. At Chintaladevi, horsegram was one of the chief November sown crops, after cereals like *jonna*, and *cumbu*. It was

grown either pure or mixed with other cereals or pulses like sunnhemp or pillipesara. The yields, however, were low as a rule, averaging only 900 lb. per acre. On the East coast, horsegram has been tried only at Palakkuppam and that too as a green manure on about 50 cents in one year (1931). Sown after the harvest of cumbu in November, it yielded about 5,600 lb. green material. On the Central Farm at Coimbatore, it has been quite a handy crop on the red soil drylands from 1926 onwards, with an average yield of 3,900 lb. green material per acre. In the Hosur tract, horsegram, lablab and gingelly are grown on a scale sufficient even for exporting to other districts. On the Cattle Farm, it has been a regular crop every year from the inception of the Station, with an average yield of 2,000 lb. of green fodder per acre. On the West Coast in the vicinity of Taliparamba, it is mainly a grain crop, sown on the drylands after harvesting *modan* paddy, often mixed with *samai* (*Panicum miliare*) gingelly or sweet potato. The *bhusa* that remains after the grain is threshed out, is an incidental cattle-feed. The yields of grain, however, have usually been very low, often interspersed with failures, both at Taliparamba as well as at the Coconut Stations. At Pattambi, horsegram was tried in 1933, as a green manure but gave only 3,050 lb. per acre as against 10,700 lb. from cowpea under similar conditions. In the southern tracts, as elsewhere, horsegram is a poor-soil crop of the dry lands, chiefly red-soil areas, where it is sown broadcast, either alone or mixed with *samai*. At Koilpatti it has yielded on the average, 450 lb. of grain per acre from the black soil area, while under irrigation, on the red soil area a phenomenal yield of 12,700 lb. green material per acre was recorded in 1936.

Other Pulses. (Black gram, Bengal gram, Green gram, Theegapesara, Lablab, Soy beans, Lentils and Lupins.)—The first four of the above eight are indigenous catch crops grown on all types of lands, just as it is convenient or necessary. Since these lands are usually poor, the yields too are poor. It is very seldom that any of them figure as a pure fodder crop—the grain is needed for human food and the *bhusa* is an incidental cattle-feed.

In the Northern Circars, green gram (*Phaseolus mungo* L.) is sown often mixed with other pulses as a second crop in November-December. Thus at Berhampur it has been grown along with kolinji and indigo on ploughed fields after paddy and harvested two months later, in February. At Anakapalle it usually follows ragi and precedes gingelly in the garden land rotation; at Samalkota, it is mixed with black gram, *theega-pesara* (creeping green gram) and sunnhemp and sown broadcast in the standing paddy in November. After the harvest of paddy, these pulses remain in the field till February, when the pods are gathered from the grams and the sunnhemp cut for hay or grazed down. On this Station, *theega-pesara* (*Phaseolus mungo* L.) has done very well as a green manure crop, the average yields from the March-sown irrigated crop being 14,500 lb. per acre. Black gram (*Phaseolus mungo* var. *radiatus*) green gram and

Bengal gram on the other hand, have been primarily grain crops, the fodder value being incidental. Soy bean (*Glycine max.* Merr.) trials were also conducted from 1932 onwards but here too, all the foreign American types failed, only two Burmese varieties Behrum and Pe Ngypi showing any signs of promise. In the Maruteru tract, black gram and horsegram are sown on dry lands in October, and harvested by February; in the wet lands, black gram, cowpea, sunnhemp and pillipesara are sown, as described already, on field bunds from July onwards—for periodical cuttings of fodder.

In the Ceded districts, Bengal gram is the usual cold weather pulse crop. At Chintaladevi, almost all the legumes, Blackgram, Bengal gram, green gram, and lab lab were sown each year, chiefly as mixtures with *Pedda jonna* and *Pairu jonna* to improve the feeding value of the jonna hay and straw. On the East Coast, at Palur black gram and Bengal gram were tried in 1915, as a second crop after early cumbu, but were given up as not sufficiently promising. Soy beans have fared no better, both here and at Palakappam and Aduturai, only green gram being any good at this last place. On the Central Farm at Coimbatore, Bengal gram is the usual cold weather pulse on the black soils, after periamanjol cholam the previous year. The yields depend so much on the extent of dewy nights at the time of pod setting that they fluctuate very widely around a low average of 300 lb. per acre. Black gram too is similar. The *bhusa* from both is esteemed as a cattle-feed. At Hosur, there is no specific reference to these minor pulses. Soy beans have been reported, after a few years of unpromising trials, to have yielded 5,400 lb. green fodder per acre in 1936. This crop has been equally difficult to raise successfully on the West Coast also, and does not on the whole seem to have much scope in the Presidency, either for grain or as fodder.

In the southern tract, at Koilpatti, owing to the high average temperatures prevailing even in December—January, Bengal gram has never been a success. The other pulses too, have been equally poor on the black soils, the yields ranging around only 200—250 lb. per acre; in fact, as noted by H. C. Sampson as early as 1910, there is really no suitable pulse for the black soils of this tract. Under irrigation, however, in the red soil areas, black gram yielded in 1936 as much as 11,300 lb. fodder per acre, thus indicating the possibilities of these pulses under liberal treatment. On the hills, at Nanjanad, where only lupins come up well as a green manure, Bengal gram and soy beans also were tried in 1935, and found to be somewhat promising.

Miscellaneous Fodders. *Sunflower (Helianthus annuus)*. This is a quick growing plant capable of heavy yields, but is not very much relished at first by cattle, so that it seems better suited for making silage than for feeding green. It was first tried at various centres in this Presidency in 1924 and was a success at Chintaladevi with an average yield of nearly 10,000 lb. and at Hosur it has been a regular crop since 1924 on about 2—4 acres each year with an average of 31,700 lb. per acre. On the

Central Farm, however, it is not mentioned after its first trial in 1924, when it gave an outturn of 7,000 lb. per acre. On the West Coast the laterite soils are presumably too shallow for its success, as the yields were all along very poor. As a rained crop on the black soils, at Koilpatti, it was noted as promising in 1929, the only year it was tried there. Sunflower was a failure on the hills.

Sweet potato vines (*Ipomaea batatas*). This bye-product of sweet potato cultivation is not only a palatable green feed but has also been noted to stimulate milk secretion. At Chintaladevi it figured from 1921 to 1924 with an average outturn of 8,000 lb. vines per acre, and at Hosur too, it has been a regular crop since 1932, with an average of 29,900 lb. vines and 6,409 lb. tubers, while on the Central Farm also, it is mentioned (in 1929, 1933, and 1936) as grown and fed to cattle.

Kollaganjeru (*Ipomaea hispida*). This hardy, drought-resistant, trailing plant was tried first at the Millets Breeding Station, Coimbatore, and was found to yield about 2,800 lb. of fodder, of a very high feeding value, being particularly rich in proteins, fats and potash. It has also been grown with success on the black soils of Guntur and Bellary and recognised as a stimulating feed for milch cows. At Pattambi it suffered somewhat from too much rain in the north-east monsoon, but gave, in spite of this, an acre yield of 7,960 lb. and proved an effective smother crop for weeds.

Summary and Conclusions.

It would be useful at this stage to sum up the general position of fodder crops in the Presidency. In the Vizagapatam district, apart from the straw from major food grains, paddy, cumbu and ragi, and to a lesser extent, the straw from cholam, korra and samai, that are utilized for cattle, fodder crops as such are not raised to any appreciable extent. The haulms and *bhusa* from pulse crops like black gram, green gram and horsegram, and groundnut also, are often utilized. Pillipesara is becoming popular in paddy lands both as a green manure as well as fodder. In the deltaic portions of Godavari, Krishna and Guntur also, pillipesara is a popular green fodder, while sunn-hemp is another common fodder crop, usually made into hay and stacked along with paddy straw. In the dry lands of these districts, however, since what little grazing was available once is all gone now, cholam either pure or mixed with pillipesara, is grown as a fodder crop in the early season and as a grain crop in the late season. In the Ceded districts, the area cropped per pair of cattle is so large that in normal years the ryot gets all the fodder he needs from the jonna straw on this area. He is, as a rule, fully aware of the fodder value of mixing legumes with his cereal straw, but, with the seasons so uncertain, he is unwilling to risk pulling down his jonna yields by sowing such mixtures. In the black soils of the south, in Madura, Ramnad and Tinnevely, the ryot usually reserves a portion of land for growing rain-fed cholam as a pure fodder crop, using a very high seed rate to get the stalks thin and fine. On the red soils, however, cholam is a grain crop.

Here, it is often mixed with pulses if rainfed and grown pure only when raised under wells. The fodder supply may be said to be adequate in these districts, but the same cannot be said of Tanjore and parts of South Arcot where paddy straw is the mainstay for cattle. Pillipesara has been a success here, so that it is worth while to advocate growing it either pure or mixed with fodder cholam in paddy lands from January till June when there is no paddy crop. Guinea grass and Napier's fodder also can be planted along bunds and sides of water channels. In the garden land districts of Coimbatore, Salem and North Arcot, cholam both as a rainfed as well as an irrigated crop, is the mainstay for fodder. Pulse mixtures too are a common practice. The merits of lucerne are getting to be well known and recognised in Coimbatore. In the town itself, a regular agency has sprung up, supplying lucerne for milch cows and jutka horses. On the humid West Coast (Malabar and South Kanara) green grass is available from July to December, and although the cattle are usually half starved for the rest of the year, from January to June, the raising of fodder crop is hardly ever practised. There seems to be a good scope here, for a wider use of forage crops like green cumbu and cowpea, converting them into silage for use during the dry months from January to June. In the Nilgiris also, the need for raising fodder crops is not yet felt, although here too, suitable crops are available, such as samai, teosinte and lucerne.

As regards the future prospect, it is safe to assume that most of the fodder requirements of the Province would continue to be met from an extension of the area under the crops reviewed above, although of course, the possibility of new introductions is not excluded. The Agricultural Department has demonstrated the utility of fodder crops like cholam, maize, guinea grass, Napier's fodder, lucerne and pillipesara. Further lines of useful activity, apart from the continuance of advice regarding the most suitable fodder crops for different localities, under dry as well as irrigated conditions, would be in the evolution of more strains of fodder sorghum, each best suited to particular tracts, and the isolation of better yielding types of other fodder and pasture grasses. In what may be termed sub-urban farming areas, there is a good scope for an intensive commercial cultivation of fodder crops, such as maize and lucerne and supplying their fodder for the town milch stock. Under such intensive cultivation, the question of rotations assumes less importance than in truly rural areas where, with the extensive type of dry land farming, it is vital to conserve the fertility of the land by a judicious rotation of crops.