

46. do. *Trans. Farad. Soc.*, 1921-22, 17, 244, 327.
47. do. *Soil. Sci.*, 1925, 19, 1.
48. Olmstead, Alexander and Middleton, *U. S. Dept. Agric.*, 1930, *Tech. Bull.* 170.
49. Olmstead and Alexander, *Soil Res.*, 1930, 2, 68.
50. Osborne, *Conn. Agric. Expt. Stat. Report.* 1886, p. 141; 1887, p. 144.
51. Prescott, *Council Sci. Ind. Res. Australia*, 1928, *Pamphlet No. 6.*
52. Puri, *Memoirs. Dept. of Agric., India*, 1929, 10, 209.
53. do. *Soil Sci.*, 1935, 39, 263.
54. Puri and Amin, *Pusa Agric. Res. Inst.*, 1928, *Bull.* 175.
55. Richardson, *Jour. Agric. Sci.*, 1934, 24, 457.
56. Robinson, *ibid.*, 1922, 12, 287.
57. do. *ibid.*, 1922, 12, 306.
58. do. *ibid.*, 1924, 14, 626.
59. Robinson and Richardson, *Imp. Bureau of Soil Sci.*, 1933, *Tech. Comm.* 26.
60. Schloesing, *Compt. Rend.*, 1874, 78, 1276.
61. Schone, *Bull. Soc. Imp. Nat., Moscow*, 1867, p. 40; also *Ueber Schlamm-analyse, Berlin*, 1867.
62. Shaw and Winterer, *Proceedings, I. Internat. Congr. Soil Sci.*, (Washington), 1927, 1, 385.
63. Sreenivasan and Subrahmanyan, *Proc. Ind. Acad. Sci.*, 1934, 1B, 123.
64. Troell, *Jour. Agric. Sci.*, 1931, 21, 476.
65. *United States Bureau of Soils*, 1904, *Bull.* 24.
66. Wiegner, *Landw. Versuchs-Stat.*, 1918, 91, 41.
67. Wolff, *Untersuchung Landw., Stoffe, Berlin*, 1875.
68. Zunker, *Landw. Jahrb.*, 1922, 58, 159.

A NOTE ON THE CULTIVATION OF ELEPHANT YAM (*AMORPHOPHALLUS CAMPANULATUS*) IN CHITTOOR TALUK

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The Chittoor variety of Elephant Yam known as *செனாய்* (*Chennai*) in Tamil and (*Theeyakanda*) in Telugu, has a reputation in the markets of the surrounding districts. The normal area in the taluk is 300 acres, but due to low prices, the area has decreased to 240 acres, in the last season.

The average area grown by a ryot is about ten cents and the maximum area grown by a single individual is about thirty cents. The crop is generally grown pure, though other vegetables like radish, onions, brinjals, *bhendai*, etc. may be found to be grown along the sides of irrigation channels, for sometime during the growth of the crop.

Details of cultivation: — *Soil:*— The crop comes up well in all kinds of soils unless they happen to be alkaline. Red loamy soil is considered to give the best yield. High-level irrigable lands are generally chosen, as the crop cannot withstand water-logging.

Season:— The months of *Chithirai* and *Vaikasi* (April to June) are considered to be the best season for planting the corm, but it can be planted upto the month of *Adi* (July--August). If a good crop has

to be raised, the planting should not be postponed to later than the middle of August. Later planting affects the size and yield, while planting before the season allows the young crop to be affected by the severe sun.

Preparatory Cultivation:— A paddy crop is always raised before Yam, even though there is scarcity of water, because, it is believed, by the ryots that the paddy crop keeps down the soil temperature from rising up very high during the growth of the succeeding crop of Yam, improves the soil texture, suppresses the weeds, rectifies the level of the field and enriches the soil.

Ordinarily, eight ploughings are given. Since the area cultivated by a single individual is small, the number of ploughings given sometimes amounts to twelve. Deep ploughing and fine tilth are considered necessary for raising a good crop. Mouldboard ploughs are able to reduce the number of ploughings by one half.

Furrows for planting are opened one foot six inches apart and irrigation channels are laid out nine feet apart across the furrows.

Manures and Manuring:— Cattle manure, shed leaves and flowers of *Pungam* and *Tamarind* trees are applied at fifteen cartloads per acre, just before the final ploughing. Sheep penning is not commonly done round about Chittoor, as herds of sheep are not available. If sheep penning (at the rate of 2000 per acre) is utilised, the quantity of cattle manure applied is correspondingly reduced. Sometimes cattle manure is applied in the furrows either at the time of hoeing or at the time of earthing up. This is done, only if the original application before the final ploughing is considered insufficient.

Seeds and Sowing:— When the land is ready, corms of average size each weighing about 2 to 3 lb. with shoots are selected, and cut into seven pieces without affecting the central shoot. The smaller-sized corms are cut into 5 or 3 pieces. Oversized corms when planted delay germination, while the undersized give less yield.

The cut pieces are planted in the furrows one and a half feet apart either way. After planting, the covering is done by hand with loose earth. Generally, the planting is done in the morning, and the field irrigated the same afternoon. One thousand five hundred to one thousand eight hundred pounds of corms is the usual seed rate per acre. Germination starts within a week and prolongs over three months. The shoot from the centre of the corm is the first to germinate and about eighty per cent germinate in a month and a half.

After cultivation:— A month after planting, the field is weeded and hoed. The second weeding and hoeing is given a month later, when the plants are earthed up with hand. About three months and a half after planting, when the plants are about one and a half to three feet high, trenches are dug between the lines about six inches

deep, with *mamooties*. After this operation, practically no inter-cultivation is done.

Irrigation :— Till the crop is earthed up with *mamooties*, irrigation is given once a week and afterwards once in four days till it is harvested.

Growth :— Secondary shoots generally start in *Maha Karthi* (second fortnight of August) when the corms begin to develop. After the development of the secondary shoot the original shoot (which is about two feet high) stops its growth and withers in the course of the next two months. When the secondary shoot turns yellow, the crop is considered ready for preliminary harvest.

Harvesting :— Digging of corms which is done with bent pick-axes commences in the month of *Karthigai* (November—December) when the crop is about eight months old. Practically the harvest lasts from the latter half of November to March. Four hundred and fifty to six hundred maunds (11,250 to 15,000 lb.) of corms per acre are obtained. The corms harvested in March are considered to be the best for future seed material. Some ryots keep a small area in the field for seed purposes till the beginning of April.

Storing :— Storing for seed purposes is done by heaping the corms in a corner within the house. The whole heap is covered with paddy straw, over which a plaster of mud and cowdung is given. This facilitates the formation of shoots to a large extent and the preservation of the corms from drying up, both necessary for the seed material. For sale, they are simply stored up and corms that give rise to shoots are sold first. The corms dug out in March keep longer. The loss from a storage of two months is about one-third by weight.

Marketing :— The produce is generally sold at Chittoor. Sometimes they are taken to the neighbouring towns of Tirupathi and Vellore in carts for sale either by the grower or by the merchants of those places. The sale price per maund of Yam (25 lbs.) varies from six to twelve annas. The corm weighs about three pounds on an average and the maximum is about seven pounds.

| | Cost of cultivation per acre. | Rs.As Ps. |
|----|---|-----------|
| 1. | Ploughing the field ten times (20 pairs of cattle and 20 men at Rs. 0-12-0 per pair and a man) | 15-0-0 |
| 2. | The cost of 15 cartloads of cattle manure at Rs. 0-8-0 per cartload) | 7-8-0 |
| 3. | Carting the manure to the field (1 pair, 2 men, 2 women at Rs. 0-8-0, 0-4-0, 0-2-0 respectively) | 1-4-0 |
| 4. | Spreading the above in the field (2 women at 0-2-0 each) | 0-4-0 |
| 5. | Forming plough furrows for planting, irrigation channels, cutting and planting corms. (½ pair, 1 man, 15 women, at Rs. 0-8-0, 0-4-0, 0-2-0 respectively) | 2-8-0 |
| 6. | Cost of 60 maunds or 1500 lbs. of corms at Re. 1-0-0 per maund | 60-0-0 |
| 7. | Hoeing and weeding twice, (40 women at Rs. 0-2-0 each) | 5-0-0 |

| | | |
|-----|--|---------|
| 8. | Forming ridges and channels with mamooties (10 men at Rs. 0-4-0 each) | 2-8-0 |
| 9. | 30 irrigations. (60 pairs and 120 men at Rs. 0-8-0 and Rs. 0-4-0 respectively) | 60-0-0 |
| 10. | Digging corms and storing, (10 men and 10 women at Rs. 0-4-0 and Rs 0-2-0 respectively) | 3-12-0 |
| 11. | Miscellaneous charges of carting and marketing, loss in weight etc. | 9-4-0 |
| 12. | Kist per acre | 3-0-0 |
| | Total expenses ... | 170-0-0 |

Profits per acre.

| | | |
|----|--|---------|
| 1. | Cost of 500 maunds or 12,500 lbs. of produce at nine annas per maund on the average | 281-4-0 |
| 2. | Cost of cultivation and marketing | 170-0-0 |
| | Net profit per acre ... | 111-4-0 |

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Research Notes.

I

Feeding of Treacle to Cattle.

At the suggestion of Mr. R. W. Littlewood, Deputy Director, Livestock, Madras, we undertook an investigation at Hosur to find out the value of including "Treacle" in the feed of cattle. The following summarises the result of the investigation.

Two groups of six heifers each, from the Kangayam herd, were chosen for the experiment. All the heifers were 2 to 2½ years old. The experiment lasted for 12 weeks. Group i or the *controls* got chopped hay at the rate of 12 lb. per animal and group ii or the *experimentals* had the same amount of hay to which 2 lb. of treacle thinned out with 4 lb. of water was added, the whole being well-mixed and put in the manger. The rations and residues were weighed every morning and the actual intake recorded. The animals were weighed in the morning thrice a week. At the end of 12 weeks, slight increases were noticed in the fodder consumption and live weight of the experiment group, though these were not statistically significant. Therefore so far as the results of this investigation go, the inclusion of treacle in large quantities in a ration is not found to be of any advantage.

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II

Milk Yields of Kangayam and Sind Cows.

The Kangayam breed is one of the best in South India for draft purposes, but, unfortunately the Kangayam cows are usually poor milkers. The average milk yield of a Kangayam cow could be taken as 1500 lb. for a lactation period, with a daily average of about 5 to 6 lb. Efforts are being made at the Livestock