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the wood and just make a mark on the other side The sides of the hole can be smoothened with a tapering sand paper block, made for the purpose. The plank is then turned upside down and the hole marked already is enlarged to permit the stem of a sliding peg being inserted. The hole then takes the final form, fig 4 The sliding peg, is made of wood with a thin stem and surmounted by a flat cone. The peg is inserted in the hole and prevented from falling out by putting in a nail on the stem, an inch from the surmounting cone It provides a play of an inch for the sliding peg.

As has been seen, the circular mould is made in an entirely different manner. The technique of making the hole is a radical change and mould-making is speeded up. The drill makes the hole instead of the chisel and mallet. The mechanical efficiency of the hand is not such a big and important factor in making the moulds as in the case of the square moulds. A specially skilled workman turns out 80 holes in a day in the ordinary mould or 50 holes in the peg-mould. A skilled workman, not specialised, would drill a large number of round holes in a day.

With the size of wood and the labour for turning out the job reduced and the specialised workman set aside, the cost of making the moulds is bound to be considerably reduced. The precision in the round tapering holes, eliminates the possibility of "cones" sticking in the holes, as often happens in the squire holes, when the sides are lightly hollowed or bulged out. The round mould is likely to last fairly long with reasonable care.

The jaggery cones resemble the old cubes in general form and appearance and are not likely to be minded by the consumers, at least not after the novelty of the new shape wears off.

It is likely that small and minor difficulties will present themselves when the mould making is first attempted as with all new attempts, but they will, it is hoped, be overcome in the usual manner by local resource and talent.

Cultivation of Leafy Vegetables in the Northern Circars

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There is a great and real need for increasing the production of vegetables at present. With the present shortage of food grains, the use of large quantities of vegetables would to that extent relieve the pressure and make up the deficiency. Vegetables are valuable human food and our country is not having a sufficiency of vegetables in general. Among the vegetables, the leafy vegetables deserve to be placed high up in the list, as being highly valuable. They are rich in calcium, iron and other minerals and are therefore capable of making up the deficiency of minerals in the food grains, especially the polished rice and the various refined grain products. Also the greens abound in vitamins A and C, which are deficient in the staple articles of the South Indian diet. The greens may therefore be classed as highly protective foods. And the greens supply liberal

amounts of soft fibrous matter and bulk, which help the bowel action. All these together raise the metabolic efficiency,—digestion, assimilation, elimination of wastes from the system, final growth and maintenance of the health of the human system.

The common plants providing the leafy vegetables are the Amaranthus, the Indian Spinach and the *Gogu*. These are commonly raised by the market gardeners in the Northern Circars and the details of their cultivation are given under.

***Amaranthus gangeticus* L.** *Mokka or Perugu thotakura* (Telugu) and *Thondu keerai* (Tamil) The cultivation of Amaranthus is confined to garden land areas that have good irrigation facilities. They come up well in fertile, sandy and well drained loamy soils. The land is ploughed repeatedly—6 to 8 times—with a country plough to obtain good tilth. Beds 8 ft. by 8 ft. are then formed with irrigation and drainage channels in-between every two rows of beds. Small beds 4 ft. by 4 ft. are common in parts of North Vizagapatam.

Rotations and mixtures The Amaranthus crop comes up in rotation with *ragi* or any vegetable crop like brinjals or *bhendai* (Okra). Different species of Amaranthus are sown mixed in the same plot, also the Indian spinach, *gogu* and coriander sometimes Mixed crops are preferred, as the land available is limited in extent.

Season Amaranthus can be raised almost throughout the year. Three sowing periods are commonly recognised and by suitable adjustment of the sowings, a uniform supply of greens is provided for nearly a period of ten months in the year. The sowing periods are June, November and February. The first two season crops come up well and the February crop occasionally suffers for want of sufficient water supply.

Manuring The greens respond to heavy manuring. Cattle manure is applied up to 25 to 30 cartloads per acre. Sheep penning also is done in certain cases.

Sowings Sowing is done early in June for the *Tholakari* crop, in November for the Winter crop and in February for the Summer crop. The seed collected from the previous crop is used. Seed is collected from a few plants set apart in the field. The ripe and dried panicles are gently tapped and the seeds that shed are collected, winnowed and stored in cloth bags. Seed is also available in the local shandies for sale, at 12 annas per Madras Measure. Sowing is usually done in the cool evenings, preferrably after a rain. The seed is mixed with twice its volume of sand and broadcasted evenly over the prepared beds and lightly covered with soil. Two Measures of seed will sow an acre.

After-cultivation The seeds germinate in about a week and the plants put forth 3 to 4 leaves in a fortnight. Thereafter the plants make rapid growth, provided the supply of water is regular. The crop requires

copious irrigations and drainage is also equally important. The crop is weeded a fortnight after the sowings and hoed a week later. A second weeding is also done when necessary.

Harvest The crop is ready for harvest in 40 to 45 days from the date of sowing and it is done in stages. The harvest is spread over a period of three weeks and this ensures a steady and continuous supply of greens to the market. Further the sowings are also done in batches, in small areas each time, at intervals of 5 to 7 days. The harvest is done almost daily and the womenfolk themselves attend to the harvest and sale of the greens in the Vizagapatam District, without engaging extra labour.

Individual farmers cultivate up to a maximum of 30 cents of amaranthus. It costs Rs. 5 to cultivate an area of ten cents and the produce may be expected to be sold for about Rs. 10 to 12. Amaranthus is a popular green in the Circars and it finds a ready sale in the local markets.

Amaranthus gangeticus* L. var. *tristis*—*Koyya thotakura (Telugu) *Araikeerai* (Tamil). This is a variety of amaranthus which has a thin stem and a semi-trailing habit. This is cultivated just like the *Amaranthus gangeticus* mixed with other crops, and pure crops are not uncommon. This is raised in certain villages of the Vizagapatam District for providing fodder for work bullocks and buffaloes. It is supposed that the greens heat the system and reduces milk yields. It is not therefore fed to the milch animals. It is raised as a fodder in the same plot year after year, from January to August.

The *koyya thotakura* is considered inferior to *mokka thotakura* for human consumption and is available in the market at cheaper rates.

Amaranthus paniculatus*—*Pedda thotakura (Telugu), *Pungi keerai* (Tamil). This variety of amaranthus is very popular in the Vizagapatam district. The stems are very tasty and they are cooked and dressed in various ways. The variety largely cultivated round about the village of Rega goes by the name of *Rega thotakura*. This is particularly valued in and around Vizianagaram and is always in good demand. While the rind of this variety is hard, the inner medullary portion is soft and sweet and is much appreciated by the consumers. Other varieties of amaranthus are not known to have this special characteristic.

Cultivation About half a Measure of seed sown in a 5 cents nursery will plant out an acre. Seedlings, 2 to 3 weeks old, are transplanted 1½—2 ft. apart either way in the main field. The seedlings planted in May are ready for harvest in October. When sold wholesale, the crop fetches Rs. 150 from an acre of the crop. Four to eight plants per anna is the retail rate in the market.

***Basella rubra* L.**—*Mattu bachalakura* (Telugu), *Pasalai keerai* (Tamil). This is the Indian spinach and the soil, tillage and manurial requirements are the same as those of amaranthus. Two crops are ordinarily raised, one in June and the other in November.

Sowing The green is raised as either a pure crop or mixed with amaranthus. Half a Measure of the seed will broadcast an area of 10 to 12 cents. Seedlings are also raised in nurseries and transplanted 1½ ft apart either way, by the middle of June Ten to fifteen days old seedlings are used for transplanting. The crop may be given 4 to 5 irrigations in all

Harvest Side shoots alone are harvested once in 10 to 12 days, in places like Bobbili. In general entire plants are pulled out just before flowering in other places, for sale in the local market. A plot of 10 cents will yield 80 to 100 baskets of greens valued at Rs. 10 to 12, and the cost of cultivating the area is about Rs. 5. The green is used in soups and is in fair demand.

***Basella rubra* L.**—*Pedda or Theega batcholi* (Telugu) This trailing variety of the Indian spinach is grown for the market, in parts of East Godavari, round about Peddapuram and Pithapuram and to a limited extent, in the backyards of houses, in parts of Vizagapatam, round about Bobbili and Parvathipuram.

Cultivation Pits are made 10 to 12 ft. apart and 6 to 8 seeds are sown in each pit, in either June or October. *Pandals* are put up for the vines to climb and spread out. After the germination of the seeds, two or three vigorous plants are retained and the rest are pulled out. As these plants grow, they are trailed on the *pandals*. A *pandal* 20 ft. × 20 ft. will accommodate 4 pits. The pits are manured with cattle manure at 2 to 3 baskets per pit, a fortnight after sowing. The application of red earth to the pits is also common and it is said to accelerate the growth of the vines The plants cover the *pandal* in 2½ to 3 months, when the tender side branches are gathered periodically. Both the stems and leaves are used in making soups. The cultivation of this green is after all done to a limited extent only.

The Indian Sorrel *Hibiscus cannabinus* L., *Gongura* (Telugu), *Pulimanchi* (Tamil). The Indian sorrel is a tall undershrub which is cultivated extensively in the Circars and the Ceded Districts. The leaf is sour and is used largely for making chutney. The leaf obtained from a crop grown mixed with *Variga* in dry land is said to be the best for purposes of preservation. The leaf is fried with a small quantity of salt and kept in storage as a stock material for preparing chutney, when required.

The crop is deep rooted and is not exacting in soil, irrigation and manure requirements, like the other greens. It is grown in the dry soils, mixed with redgram, and rarely as a pure crop. The sowings are made in June, November and February. A pure crop requires 5 to 6 lb. of seed per acre. If the soil moisture is adequate at sowing time, the crop may be expected to come up well with the usual rains. The leaves are picked once a week, from the eighth week onwards for about 3½ months. A plot of 10 cents will yield greens valued at Rs. 6.