

Agricultural Research in Groundnut Cultivation

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Introduction: Modern agricultural science developed from the days of Liebig and Schubler in Germany, Boussingault in France and Lawes and Gilbert in England. Since then research in agriculture has made vast strides and other sciences like chemistry, biology, physics, etc., have also contributed to its development. Improvements by way of evolving new strains, new control methods against weeds, pests and diseases, etc., are also being effected year after year. The urge for bettering the achievements of to-day is growing and is bound to grow, as is reflected in the title for this year's symposium.

In the Madras State research in agriculture started from 1902, when an Economic Botanist was appointed for plant breeding. However, research on oilseeds, particularly on groundnut, was started in a full-fledged manner only from 1930. During the last 25 years great improvements have been made in the cultivation of groundnut in this State, much to the benefit of ryots. The recent advances in this field have been dealt with by Seshadri C. R. (1954). Improvements which are in the trial stage and which are sought to be effected in the field of agronomy and mechanical cultivation, with particular reference to groundnut are discussed in this paper.

1. Improvements by Breeding: Breeding strains for some special attributes besides high yield, is the foremost item in the improvement work on groundnut. With the greater knowledge acquired in the breeding technique suited to this crop it is possible by hybridisation to evolve new strains which combine desirable economic characters and high-yielding ability.

The bunch variety of groundnut is extensively grown in North Arcot District and Pollachi taluk of Coimbatore District. Its cultivation is gradually finding favour in other districts also, on account of its short duration and ease of harvest. Unfortunately, this type has a major drawback in the non-dormant nature of the seeds. Unlike the seeds of the spreading groundnut, the seeds of the bunch type do not require any resting period after harvest. If wet conditions prevail at harvest time, the mature pods begin to sprout in the field. The harvest of the bunch groundnut is possible only after rains and any delay in taking up this operation results in large-scale germination of the nuts in the field. It has

been reported from the bunch-growing areas that in certain years even upto 80% of the produce are rendered unfit for marketing due to sprouting of seeds. The seeds of spreading groundnut do not germinate immediately on maturity as they require a resting period of one to two months. There is therefore an urgent need to evolve a bunch type of groundnut with dormant seeds. This problem has been receiving attention at the Agricultural Research Station, Tindivanam and some progress has been made in this direction. After years of work a strain (AH 6481) has been evolved by hybridisation. The strain has a bunch habit of growth and dormant seeds. In the trials conducted at Pollachi the strain has shown superior performance. But its duration is longer than that of the ordinary bunch groundnut. More intensive work is necessary to evolve dormant bunch strains with short duration.

After the War, there is not much of export of groundnut and almost the entire production is utilised for crushing purposes. The growth of Vanaspathi industry in India has accounted for a large share in the internal consumption. In the manufacture of Vanaspathi or vegetable ghee, the groundnut oil has to be decolorised before hydrogenation, as the oil available in the market is coloured on account of crushing kernels with pink seed coats. A white-seeded type of groundnut will naturally yield a colourless oil, thus eliminating the need for decolorisation and refining, which are costly processes. A dirty white-seeded spreading type is available in the varietal collection maintained at the Agricultural Research Station, Tindivanam. But it is not a heavy yielder and recently two white-coloured bunch types have been introduced from Australia and East Africa. These will be utilised for evolving white-seeded new forms.

Though India is one of the biggest producers of groundnut in the world, the per capita consumption of groundnut is very small, about 1-2 lb. In Madras State before partition, the per capita consumption of groundnut was about 3 lb. In America, the per capita consumption for edible purposes is much more, being about 11 lb. There is therefore large scope for increasing the consumption of groundnut kernels in the State. Groundnut kernels are rich in nutrients and its popularisation among the masses will go a long way in improving the health of the people, especially of those accustomed to a poor cereal diet. The varieties that are at present cultivated on a large scale in this State are mainly commercial types suitable for crushing. The qualities that are usually preferred in a dessert-type are large, uniform size, good colour and low oil content. There are no forms in the existing collection which combine all these features and high yield. They are found distributed in different forms and hence by intensive selection and hybridisation work they will have to be brought together in one form. This item of improvement has already been initiated at the Agricultural Research

Station, Tindivanam and four promising strains are undergoing tests in cultivators' holdings. The performance of these in the districts is found to be encouraging and it should be possible to release one of them for general cultivation shortly.

2. **Improvements in Agronomy:** In this State groundnut is invariably sown by dibbling the seeds behind country ploughs, whereas in the Andhra State sowing is done with the country seed-drill known as 'Gorru'. In foreign countries sowing is done with tractor-drawn implements in rows 2 to 3 feet apart. Till now the Department has been recommending a spacing of 6" \times 6" for the bunch and 9" \times 9" for the spreading groundnut. These spacings are obtained by adopting a seed rate of 100 lb. for the bunch and 80 lb. for the spreading. Row cropping as practised in Andhra and elsewhere has been found to be economical as it facilitates intercultivation and harvesting operations with implements. Experiments are under way to find out the effect of adopting wider row spacings between rows and closer spacing in the row. The results obtained during the last two years show that adoption of wider row spacing for groundnut results in higher yields and saving in expenditure for sowing, intercultivation and harvest. This practice should be made a regular feature in groundnut cultivation by intensive propaganda. It is estimated that if this practice is adopted even over a tenth of the groundnut area in this State, it will lead to a gain of forty lakhs of rupees to the groundnut cultivators.

The problem of manuring the groundnut crop has been receiving the attention of the Oilseeds Section for nearly two decades now. Results so far obtained show that the groundnut crop responds well to applications of potash and in certain years to phosphoric acid also. In recent years the trend in fertilisation is to supply all the ingredients required for the crop and not the only one to which it is partial. Complete fertilisers are more popular nowadays in foreign countries and also in this country. Years of trial have revealed that application of mixtures with low nitrogen, medium phosphoric acid and high potash, result in higher yields. A number of such proprietary mixtures with different proportions of NPK are in the market at present. A recent advance in fertilisation methods is the placement of manures in the zone wherefrom the plants could utilize them to maximum advantage. There is also economy in the use of fertilisers by resorting to placement. Methods of placement and implements for that purpose are under trial and the results will be passed on to the ryots in the near future.

The advantages of rotating groundnut with cereals in drylands have been well established. Demonstration plots in ryots, fields to bring home to them the advantages of such rotation are being organised in a number of centres in the districts. It is hoped that this groundnut and

cereal rotation will become a regular feature in this State and help the cultivators to reap maximum benefits. The practice of raising groundnut in wetlands after the harvest of the main crop of paddy is also becoming very popular. With increased irrigation facilities, the practice is bound to become more popular as it has already caught the fancy of the growers.

3. **Improvements in the Mechanical Cultivation of Groundnut:** The recent trend in agriculture is towards mechanisation. Whereas in other countries mechanical cultivation has made rapid strides, in India it is only in the initial stages. Groundnut cultivation with machinery is being tried at the Agricultural Research Station, Tindivanam from 1948. A separate scheme financed by the Indian Central Oilseeds Committee with the object of evolving tractor and bullock-drawn implements is also being worked out in this State. The results achieved so far are very encouraging and hold great possibilities for the future of groundnut cultivation in the State. A brief account of the achievements and work in progress are given hereunder.

(a) *Seed Drill:* These are designed on the model of the bullock-drawn mechanical seed drill for use with the tractor. Three or four such designs have been under trial and they have given encouraging results. With some minor improvements it is hoped to recommend an efficient drill for large-scale use with the tractor. These drills are capable of sowing an area of 12 to 15 acres in a working day of eight hours.

(b) *Tractor Guntaka:* Modelled on the H. M. guntaka No. 2, a tractor guntaka with 6-foot blade has been designed. Trials carried out with this implement have given satisfactory results even under adverse conditions of soil moisture. The implement is capable of lifting 8 to 10 acres of groundnut crop in a day.

(c) *John Deere (side delivery) rake:* This implement costing about Rs. 2,000/- was tried along with the groundnut harvester. It collects the harvested plants and leaves them in neat rows six feet apart. To a certain extent it takes out the pods left in the soil and brings them up to the surface. The power required for this being low, it can also be hitched behind the tractor guntaka.

(d) *Peanut Picker:* A peanut picker costing Rs. 3,300/- manufactured by Messrs. Ransomes and Jeffries Ltd., Ipswich, England and supplied by William Jacks Company, Ltd., has been under trial at Tindivanam since 1948. After extensive tests and modifications suited to local conditions, the machine has been giving more or less satisfactory performance. The harvested vines with the pods are dried for about three days in the sun and fed into the machine. The pods are

separated, winnowed, cleaned of mud, etc., and bagged. The picker is worked with a 5 HP oil-engine or from the belt drive of the tractor and can handle the produce from 10 acres in a day of 8 hours.

Trials are also in progress with groundnut pod and seed graders and groundnut hand-decorticators. These implements when perfected, will prove as great aids to groundnut cultivation in the State.

From the above review it will be seen that groundnut improvement work in this State has a very bright future and promises to place the industry on sound foundations.

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