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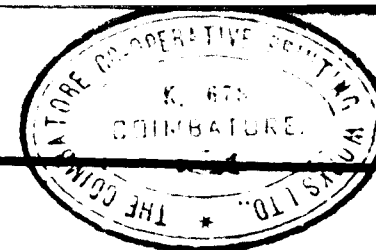
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An Announcement

At the General Body meeting of the Madras Agricultural Students Union held on 21—8—1960, it was decided unanimously that the rates of subscription of the members be enhanced as given below with effect from 1—7—1960.

Gazetted officers and other subscribers	Rs. 8'00 per annum
Upper subordinates of the Madras Agricultural Department	Rs. 6'00 „
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Sri S. K. Patil with Hon'ble Minister, M. Bakthavatsalam, Secretary, Food & Agriculture, Director of Agriculture, Dean & Additional Director of Agriculture and Collector of Coimbatore.

Photo by P. R. Damodharan.

The Madras Agricultural Journal

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In addition another Agricultural College is to be opened in a suitable locality. It is further stated that the possibilities of establishing a Rural University in the state is to be actively explored. A token grant of Rs. 10,000 made towards this end vouchsafes for the interest the government has shown in proceeding with its objective.

With all these increased facilities it is hoped that there will be substantial increase in food production in the Third Plan period. Sri S. K. Patil, Union Minister for Food, had remarked that Madras could be proud of its proficiency in agriculture. Individual farmers had demonstrated that their production in small areas for competitions could compare well, if not excel, those obtained in other parts of the world. This, incidentally, serves as a reminder that with increased facilities, increased effort is also needed for achieving positive results.

While such incentives for increasing food production have to be appreciated, there is a feeling of unrest in the minds of the people which has to be dispelled if agriculture is to succeed. It has been pointed out that while price line in agriculture could be held, that of industry has not been kept under control. This economic imbalance will in the long run tell upon agriculture. It is hoped that with a stable economy agriculture will flourish to its full extent in third plan period.

Academy of Agricultural Science

(Inaugurated on 20—8—1960 by the Hon'ble Minister for Home and Agriculture)

Welcome Speech of the Dean, Agricultural College and Research Institute, Coimbatore

Hon'ble Minister, Ladies and Gentlemen,

It is with a sense of gratitude that on behalf of the Academy of Agricultural Sciences, I thank our Minister for Agriculture for sparing the time to be present with us here to day to inaugurate the Academy of Agricultural Sciences, Coimbatore.

In this connection, I would like to say a few words on the genesis of this new Academy of Agricultural Sciences. As every one is aware ever since this Agricultural Institution was established more than 50 years ago, it has not only been an Agricultural College, training students in the under graduate course for B. Sc. (Ag.) degree but from the very beginning it has also been a Research Institute. In other words, besides teaching work there has always been intensive research work. As our Hon'ble Minister explained yesterday in his speech on the occasion of the opening of Postgraduate Block, the Agricultural College and Research Institute started just with Agricultural Botany and Chemistry. In those days, there was only one Section for all Botanical and breeding work called Economic Botany, but with the advancement of work particularly in plant breeding and genetics this got divided into several specialisations particularly on individual crops like rice, pulses, cotton and millets etc. The advancement of the Agricultural College & Research Institute, and its expansion of activities gave a fillip to experimental work and dissemination of results of research both through popular articles and scientific publications. We should certainly pay our tribute to those who are responsible for establishing certain good traditions in this institute and for having started the Madras Agricultural Journal as one the chief activities of the Madras Agricultural Students Union. From the year 1911, within about four years of the establishment of the institute, this monthly publication the Madras Agricultural Journal was started to give an opportunity to our scientific workers and the technical men in the department to publish their results of research and investigations in the form of scientific and popular articles. It is a matter of gratification that this Madras Agricultural Journal has been maintaining a tradition of continued publication and has been appearing regularly every month throughout these 47 years except during brief temporary breaks during both the World Wars, I and II.

Now, apart from this there was another effort made in the early years to form an Association of the Economic Biologists and for this Economic Biologists Association we had Sir T. V. Venkatraman and Dr. B. V. Nath among others as sponsors. Real work was done by the Association of the

have encouraged the men of the Department who have joined the Post-Graduate Centre by every means, by granting them study leave, exempting them from tuition fees, and providing extra remunerations in the shape of monthly allowances or stipends. I do hope that these scientists whom we have sponsored for such training in our own Institute here will not only benefit themselves in their future career, but also put their shoulders to the wheel with their higher training, to eventually help agriculture on its feet by their deep devotion to research. The other programme which the Government have adopted for a number of years now, is to encourage our scientists to go abroad, through several foreign aid plans such as the T. C. M., the Rockefeller Foundation and the Colombo Plan, etc. As I have already said in their case also, we expect them on their return to apply themselves intensely to their work after their training.

The Government have been sparing no pains to see that the laboratories at this Research Institute are well equipped. If there is any gap in the matter of modernising the laboratories of our Institute or in any facilities which are lacking for furthering agricultural research, I would always be glad to listen to concrete proposals and assist in the implementation of such proposals.

Any scientific work in agriculture proves its value eventually by its actual profitable application. The sum total of achievements of our Institute here will be gauged eventually by the benefit which agriculture in the State particularly and in the country generally, has derived from the findings of research. Every scientific investigation therefore should be properly programmed critically scrutinised and promptly implemented so that concrete results will be achieved which can stand the test of time. It is for this reason that a Research Council has been established in this Institute. The duties of the Research Council are to stand guard over the experimental work conducted in the Institute and its connected 31 experimental stations spread all over the State. I am glad that the Research Council has been helpful in guiding the research programmes so that they are linked up with real problems of the farmers. One of the ways by which the quality of scientific investigations can be gauged is for the investigator to present his findings and observations before a scientific body whose critical appraisal will upgrade the quality of his work. I have listened with interest to a description of the ways and means by which this Institute has been tackling this problem of improving the scientific work of this Institute. The Association of Economic Biologists for a time did useful service. The annual Scientific Workers' Conference conducted by the Research Council for the last 10 years has also promoted active scientific work. However, the Scientific Workers' Conference has been confining its activity to the Research work done only in the Agricultural College and Research Institute, here and its connected

research stations. But in scientific work it is also necessary that fresh winds from outside are allowed to blow into the portals of our Institute and Research Stations. A critical evaluation of our scientific work frequently through conferences by the association of agricultural scientists from outside, would be for the benefit of not only the Scientific Workers themselves, but for the agricultural research as a whole in the State. I am therefore very happy that the Research Council has now organized an Academy of Agricultural Sciences to promote measures for improving the quality of scientific work in our Institute and the Research Stations, and to provide exchange of ideas between research workers of this State and outside. I am also glad to see that it is intended to hold seminars or scientific conferences of an All-India nature pertaining to agricultural research and if possible to organise once in a while International seminars in chosen fields of agricultural research. In organizing such seminars which eventually would be useful in upgrading our own work in this State, I would like to assure you all that when concrete proposals are placed before the Government, we will be glad to consider them favourably. The assistance of International Organisations such as the UNESCO and the Food and Agricultural Organization should also be obtained wherever it is possible.

It will be with interest that I will be watching the progress of your well thought out organisation, this Academy of Agricultural Sciences.

OBITUARY

We deeply regret to record the sudden demise of Sri P. H. Rama Reddy on 21-9-1960. He was one of the eminent Directors of Agriculture of the undivided Madras State and associated himself in an enduring way with the Madras Agricultural College and the Madras Agricultural Students' Union in particular. He was the Professor of Agriculture and Vice-Principal of the Agricultural College, Coimbatore from 1928 to 1930 and subsequently the Principal. He held the post of the Director of Agriculture, Madras from 1937 to 1943, during which period he won the appreciation of the Officers of the Department and the Government by his meritorious service. He also held the post of Chairman, Indian Central Cotton Committee and the Regional Food Commissioner, Madras.

We convey our heartfelt condolences and sympathies to the members of the bereaved family.

Pollination and Pollen Handling in Horticultural Crops

by

V. N. MADHAVA RAO, and J. R. KING*

The expansion of the fruit and vegetable industry throughout the world, with increased acreages of insect pollinated crops, has created a growing need for a more basic understanding of pollens and for more effective methods of artificial pollination. This is particularly true when either the natural process fails or is insufficient to set a good commercial crop of fruit for the grower or when the plant breeder knows that his methods of pollination, or the pollen he uses, are inadequate for his purpose.

Nature has provided many remarkable contrivances to help assure natural pollination; however, high production of many commercial crops, such as the deciduous fruits, often requires additional help for the natural process, either as pollinizer interplants or grafts or by artificial pollination; while artificial pollination methods should always be used in breeding experiments in order that the purity of the breeding material can be assured.

Commercial production methods of many fruits and vegetables today make it necessary for the grower to know the value of the process of pollination in the setting of his crop. He should know, for example, whether his crop varieties must be cross pollinated, and, if so, what variety or other varieties would be the best pollinizer. His orchard, or plantation, planting plan must provide for the proper interplanting of the pollinizer plants among the crop producing plants; and facilities must be provided, when necessary, for the activities of pollen-carrying insects. Artificial "mass" pollinations to supplement the failure of natural pollination are yearly saving some tree-fruit crops in certain areas of the U. S., and should be experimented with elsewhere. Many methods, and devices, have been tested to replace the natural process, such as, the mixing of hand or bee-collected pollen with Lycopodium spores, diatomaceous earth, talc, etc., and dusting it over the plants with hand and power dusters or from an airplane. Such mixtures have also been exploded

from hand-made bombs and shotgun shells, or sprayed as a water solution over the plants. These methods, and others like them, are spectacular and have some merit; however, none of them has, thus far, been as successful in the setting of a crop as has the slower hand pollination of individual flowers. The placing of bouquets of pollinizer variety flowers among the crop plants, which is an effective method of substituting for the absence of pollinizer plants, cannot be considered as entirely a practice in artificial pollination.



Lyophilization or Freeze-drying of pollen. Picture shows the sealing of the 'tear' bulbs containing pollen.

Research on pollen handling and commercial crop pollination methods has disclosed valuable information on pollen behaviour under various environmental and biological conditions relative to the process of artificial pollination. A mixture of pollens from two or more varieties, for example, will often induce a better fruit set than will the pollen from just one pollinizer; while the artificial supplementary pollination of some vine crops will often increase the yield. The amount of crop set, the number of seeds per fruit, and even seed germination and seedling growth are sometimes increased from cross-pollination by the addition of maternal pollen to that of the pollinizer variety, as in the case of some apples. There has been only limited success from pollination by bees which before leaving the hive must crawl through beehive inserts which contain the pollen of the pollinizer variety. The bees either carry very little of the pollen out of the hive since they often crawl along a narrow path through the

* Respectively, I. C. A. Participant in the Louisiana State University Baton Rouge (now Reader in Horticulture, Agricultural College & Research Institute, Coimbatore); and Associate Professor of Horticulture, Louisiana State University, Baton Rouge, Louisiana, U. S. A.

pollen, or they have too little of it left on them when they begin to visit flowers. Pollen carried by bees for long distances has been found to sometimes be nonviable when deposited by the insect on the female flower structure in the process of pollination, while artificial mass pollination of deciduous fruit trees with power sprayers is ineffective since the pollen is maserated by nozzle pressure. Natural pollination, however, has been aided by the spraying of the flowers with a sugar solution in order to attract the pollinating insects.

Few areas of horticultural research have brought greater returns to the fruit and vegetable grower and to the consumer in recent years than has crop breeding; still, the research on pollination methods and on the use of pollens for breeding purposes have been limited, for the most part, unfortunately, to the needs of individual plant breeders. More attention is being given now, however, to the overall field of pollination and pollen handling (which includes pollen collecting, drying, viability testing, storage and shipping).

Methods of collecting pollens for breeding purposes have not been greatly improved on in recent years. When pollen is not transferred directly from the anther to the stigma, it is secured by the collection of flowers, from which the pollen-laden anthers are extracted with fine-pointed scissors, a comb, forceps, a screen, or with specially constructed extractors, such as notched scissors, the mechanical vibrator, or the vacuum collector. The anthers are then often dried (when necessary for the release of the grains from the pollen sacs), and are placed in vials for use in pollination. The techniques of emasculation and application of the pollen to the stigma are almost as numerous as are the variations in floral structure of horticultural crops. The possible future practical use on some horticultural crops of the new gametocides (male suppressor chemicals) to breeding techniques offers a ray of hope for the breeder's release from the tedious task of flower emasculation; but he will continue to apply pollen to the stigma with a brush, a cork, a syringe, a rubber bulb, a cotton swab, an atomizer, the finger, or by various similar ways, depending on the kind of pollen and the floral structure involved in the pollination.

Certain aids to fruit and seed development in breeding experiments have been recorded. The application for example of large quantities of pollen to the stigma or the repeated application of pollen within 12 or 24 hours often results in greater fertilization in

intra-varietal and intervarietal crosses and in the hybridization of more distantly related forms. Also, the application to the stigma before pollination of an aqueous solution of crushed anthers of another variety has been found to increase fertilization, presumably by correcting the deficiency of certain hormones responsible for fruit set. Many tree fruit and vegetables furthermore are known to have increased fruit set and seed development when hand pollination is carried out in the bud stage, rather than when the flower is mature; while increased flowering and a more even blooming period is now often brought about, especially in vegetable breeding, by regulation of day length with artificial lighting.

The potency of pollen at the time of its transfer to the stigma is vitally important to the success of both plant breeding procedures and the set of a commercial crop. The viability of pollen varies even within the anthers of the same flower; and is, of course, greatly influenced by environmental conditions. It is unusual for pollen to be 100 per cent viable. The increase in the use of artificial pollination during recent years has resulted in the realisation of the importance of maintaining the viability of pollen in artificial environments, since it is after the collection of pollen (for latter use in artificial pollination) that the greatest care should be taken in the handling of it. The vitality of most pollens goes down rapidly after collection; and few pollens are potent enough for use in pollination after a few days in an uncontrolled environment, particularly when the temperature is high. Many horticultural crop pollens will stay strong enough for repeated use in pollination over a period of several days to a week when they are kept in a household refrigerator (after drying and storage in vials); while some tree fruit pollens have remained viable for many months (undisturbed) under these conditions.

Research on long-period storage (from several months to several years) has shown that, in general, pollens of many horticultural crops will survive for many months, but with gradually decreasing vitality, in temperatures just above freezing, as long as the relative humidity of the storage environment is controlled and the pollen is not disturbed. Quick freeze and liquid oxygen methods have shown promise for such storage (although the latter is impractical for general purpose storage), and there are encouraging results at L. S. U. on pollen longevity under freedry conditions. The physiological responses of the pollen grain to environmental changes are, however, still too little understood for longperiod storage methods now in use to be considered routine and practical.

it was, as H.M.S. "Magicienne" found in 1833, attempting rather to develop a monopoly trade in betel nuts and edible nests.¹⁴

In these circumstances there was at this time little inclination on the part of the British to interfere in the Nicobars; nor were they interested in the Andamans, although these might be deemed to have been still in their possession. Nevertheless Captain Crisp, a country trader from Moulmein, brought before the Madras Government in 1836 schemes to cover both groups of islands. He had, he declared, made frequent voyages to Car Nicobar, and

"established feelings of good fellowship with the influential men or Patriarch [s] on that island.

"On my last visit thither in February last, I ascertained they had killed three men and one woman of their own class or tribe, two, a man and woman, for eating children, one man, an Elder, for securing and holding communication with some outlaws in the wood, one man for attempting to spear another.

"On my remonstrating with them for killing their fellows, they justified themselves on the plea of the smallness of the island and their known inability to transport them elsewhere.

"Having often considered Interview Island on the west side of the Great Andaman as an eligible place whereby the Andamans might be made the great jail of India by simply removing the jail establishment at Amherst thither...., the same train of thoughts occurred to me in reflecting on what the Patriarch [s] of the Nicobars had said in justification of themselves, and while I was yet revolving the whole in all its bearings in my mind an American whaler which had been there two years previous came in for supplies.

"I submit with due deference to the judgment of Government that to facilitate the increase of American Whalers by allowing them to get a footing and a place for themselves and their missionaries would be to increase their seamen and their naval strength, to avoid which I submit, it would be advisable to induce the Danish Government to abandon the Harbour of Nancowry in our favour and good Policy supported by Humanity [should induce us] to make a settlement at Interview Island whither the malefactors from the Island of Car Nicobar might be removed, who again might be made the means of civilising the inhabitants in the Andamans."¹⁵

14. As footnote 6.

15. Crisp to Madras Secretary, 8 Apl. 1836, Board's Collections 72400, p. 3.

A few weeks later Crisp produced further reasons for intervention. Two French missionaries, Chabord and Plaisant, settled in Car Nicobar,¹⁶ and the Captain reported the fact to the Government.

"Presuming the right now exercised by the Danish Government over the island and harbour of Nancowry to have emanated from their missionaries having settled thither, it is to be apprehended that this may be the intention of the French Government with the view to transport their convicts thither from Pondicherry.

"In my opinion the time has arrived when our Government should openly indicate their intention to exercise a paramount influence over these Islands to prevent other Powers from obtaining either influence or footing."¹⁷

There had been convicts at Blair's settlement, but the notion that criminals from Burma, or even from Car Nicobar, might be the instrument of civilisation in the Andamans was a new one. It was important for the future, but as yet the Indian Government was not interested, and did not "consider that it would be politic to take any steps for establishing more intimate relations than now exist with the native chiefs and population" of the Nicobar Islands.¹⁸ Later Crisp heard that one of the missionaries had decided to settle on Teressa, and this strengthened his "suspicion that the French Government intend making a settlement on one or more of the Nicobar Islands". The British could support their interests by "affording to the influential men (say three) at each village the means of securing any of their criminals preparatory to their removal from the Island at the same time to promise to reward these three men's fidelity by an annual gift of stout silver wire...."¹⁹ The Government, however, was clearly not attracted by these apparently cheap and easy methods of civilising the islands; it had "no apprehension of the designs of other European nations and no desire to establish relations ... with the chiefs and tribes of the Nicobar Islands".²⁰

16. Christian, p. 226. Chabord's name is variously spelt in the documents, but in this paper Christian's version has been followed.

17. Crisp to Madras Secretary, 11 June 1836, Board's Collections 72400, p. 5.

18. Prinsep to Crisp, 13 July 1836, Board's Collections 72400, p. 8.

19. Crisp to Prinsep, 6 Dec. 1836, Board's Collections 72400, p. 9.

20. Prinsep to Crisp, 7 Dec. 1836, Board's Collections 72400, p. 11.

mark to get the proportionate wages at the end, in kind. The proportion of produce shared by the labourers range from one-fourth to one-twelfth the quantity picked depending upon the stage of picking, intensity of bursting and availability of labour. The system of payment on a contract basis is occasionally met with in some villages of Coimbatore District. The system of cash payment is slowly replacing the system of payment in kind.

Harvesting cotton by snapping is common near about urban areas in Coimbatore District. Here, the whole boll including the seed-cotton and bur is snapped by hand. Holding the snapped boll in the left hand, the seed-cotton is pulled out with the right hand and put in to the folds of cloth in the lap. The bur is then thrown away in the field. This method, it is claimed, reduces the strain of bending. Cotton harvesting is a tiresome work. In picking, the labourer has to stoop or bend almost continuously for the greater part of the day for pulling out the locks from the bur retained on the plant. In snapping, the ripe burst boll is snapped as a whole, by stretching the hand and snapping the boll. Once a boll is snapped, the labourer can stand conveniently till the seed-cotton is pulled out from the bur.

The usual practice in South Arcot District is to engage a few labourers who snap all the ripe burst bolls and bring them home. The peasant-proprietors and the labourers sit together in the *pial* or courtyard of the house and pull out the seed-cotton from the bur. This is a convenient method for a small land-holder and the member of the family to work with. The owner and the members of his family go out daily to the cotton fields, snap the burst bolls and bring them home to remove the *kapas* from the bur at their leisure hours.

In parts of Salem District, especially in Tiruchengode taluk, a unique practice is prevalent. The unripe bolls are snapped in the field, brought home, dried in the sun and beaten with sticks to break open the bolls. The bur is then used as a fuel. This method is followed as a measure to guard against pilfering of seed cotton from the fields. The seed-cotton collected in this way, is weak, immature and fetches a low price.

There is also the practice in the interior parts of Salem District, to snap the burst bolls, gather them in a basket, sprinkle water and then extract the seed-cotton. It is claimed that by this procedure, the *kapas* could be extracted as locks and also the extraction of *kapas* is made easy. The *kapas*, thus gathered is usually

sold to the merchants on the same day, with a view to gain weight. This method not only affects the quality of lint, but also the viability of the seed, unless properly dried.

Storage of Kapas: The storage of harvested *kapas* is almost similar throughout Madras State. The daily collection of seed-cotton is heaped loose in a corner of the house over a thin layer of sand to prevent dampness or termite attack. The heap is pressed to hold more quantity. In some cases, when the quantity is small, the *kapas* is stored in gunnies. The petty landlords sell away their produce as and when there is need for money without waiting for the market to rise. Generally, no special containers are used by the growers for storing cotton. The containers are supplied by the buyer at the time of purchase for packing and transport of *kapas*.

Need to improve the methods of Cotton Harvesting: In India, the value which a cotton grower receives for his produce is more or less directly related to the staple length, ginning outturn and cleanliness of the produce. The growers care more for higher lint yield whereas the mill industry is anxious to have better quality lint. The quality of cotton depends up on the grade, staple length and character. The grade of cotton is determined by three factors viz., colour, foreign matter and ginning preparation. Grade is largely influenced by weather conditions prior to harvesting, time and care in harvesting, condition of cotton at the time of ginning and the ginning equipment. The labourers employed for harvesting cotton do not take time to remove the trash from *kapas*, with the result it usually contains dirt, hulls, leaf fragments and other foreign matter which affect the lint quality and thereby the market value.

Undue exposure of cotton *kapas* in the field causes the locks to become discoloured by dust or dirt that is washed or blown into them. The leaf trash also gets collected as leaf-worms feed upon them. Later pickings often produce lower grades of lint than earlier pickings, because of weather and insect damage and the plant leaves being drier and more brittle with more tendency to become entangled with the locks of cotton in the plant. It is, therefore, essential that seed-cotton should be collected and stored separately. It is also necessary that the *kapas* should be harvested in the cool hours of the morning.

In India, pre-cleaning machineries are not installed in many of the ginning factories. The higher foreign matter content causes undue wear and tear of the ginning machinery. Clean picking of

cotton not only reduces the wear and tear of the ginning machinery but also gives a uniform grade of lint. It also effects a definite saving in freight on transport of the trash content which has to be removed for improving the grade. The more free, is the seed-cotton, from impurities the better and easier goes the ginning process and higher are the spinning properties of cotton.

The trash content of the cotton is now removed in blow rooms and even for this, there is an upper limit. The leaf-bits and seed coats which are embedded in the cotton are difficult to remove by repeated blow room treatment. Hence, the remedy for obtaining cleaner yarns lays in clean picking and also in better ginning. The clean cotton also reduces waste losses. The clean harvested seed-cotton lightens the work of the ginner and spinner, besides improvement in grade.

It, therefore, forms a primary requisite that cotton should be harvested clean to get a better grade of cotton and also to fetch a higher value.

Recommendations and Suggestions:

1. It is easier to remove the trash when the material is in a loose state than when it has been compressed. It is, therefore, advisable to pick cotton clean in the field itself.

2. The seed-cotton should be picked in the cool hours of the morning, since this will enable cleaner picking without the leaf bits, burs and other trash attached with the seed-cotton.

The quantity of cotton harvested in a day depends on several factors like the yield and the percentage of burst bolls, the size and kind of bolls, the height of boll from the ground, spacing between plants, the abundance of leaves and other trash, the weather and the ability of the labourer. To get the maximum turn over and to obtain the seed-cotton in a cleaner condition, it is essential to harvest the *kapas* in the cool hours of the morning.

3. After picking, the seed-cotton may be dried in the sun and then stored in rat-proof godowns. Freedom from moisture is important, since the presence of moisture affects lint quality and also the viability of seed.

The usual practice of hiring the labourers from morning till evening and harvesting the *kapas* throughout the day, with an interval of an hour in the midday, is not to the advantage of the growers.

4. It is not uncommon to pile up the seed-cotton in a corner of the field, as the harvest for the day is in progress. The *kapas* get soiled and contaminated with dirt, sand, small stones and twigs. If it is necessary to store cotton temporarily in the field, it may be done in tarpaulins, bamboo mats or gunny pieces stitched together, spread on the ground.

5. In areas where payment in kind is insisted upon, the tendency is to pick whatever comes to hand. Payment in cash should, therefore, be encouraged to aid cleaner picking free from trash and other foreign matter.

6. The practice of harvesting the unburst bolls, drying in the sun and then beating with sticks to extract the *kapas* from the fruit should be given up. Ryots should, harvest the *kapas* from the burst boll only.

7. Due to insect pests, especially boll-worms and cotton dusky bugs, the *kapas* gets stained. The good *kapas* and the stained *kapas* should be harvested, stored and marketed separately to get better price for quality produce.

Summary: The various methods of cotton harvesting followed in Madras State, their merits and demerits are discussed with suggestions and recommendations for improving the quality.

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An economic perennial Castor for the sandy coastal belt of Malabar.

Strictly speaking this is not a 'Research Note' as it is not the result of any 'Research' but merely the fruit of a prolonged 'search' for a variety of castor suited to the poorest soil in the world viz.; the sandy coastal belt of the Malabar districts. The search was motivated by the writer's conviction that firstly the poor small farmer cannot achieve any measure of prosperity and security unless he has a cash crop which he can use in a rotation or as a subsidiary or companion crop; secondly that the most suitable crop for such purposes is castor.

Many varieties were tried and discarded, mostly because they failed to thrive. Most of these were obtained through the courtesy of the Oil Seeds Specialist, Coimbatore. Finally, in desperation, Sri S. G. Aiyadurai gave me a few seeds of each of five varieties of some foreign, but unknown origin or rather pedigree. Fortunately, all these five varieties showed promise either because of their inherent suitability for or because they had sufficient plasticity to adopt themselves to the environment. Two of these were chosen for further trial because of their short duration and relatively high yields. The rest were practically discarded because their duration appeared too long and the yield in 5 months too low—5 months being the longest duration arbitrarily fixed for a 'safe' Crop.

This note, however, is not about the chosen varieties but about one of the discarded varieties which insisted on outriding itself on the writer's attention. It looked so much like an answer to one's prayer that it was kept under observation for a little over two years. Here are the observations:—

1. A stray seed close to the threshing floor germinated in the beginning of November, 1957 as a result of a couple of heavy showers at the end of October. The seedling survived throughout the ensuing dry period from November to May and started rapid growth with the premonsoon shower in May.

2. During the 12 month period November, 1957 to end of October 1958 the yield of dry shelled seed was 5 lbs. 12½ tolas.

3. Second year's yield harvested between 5—5—1959 to 15—12—1959 totalled 10 lbs. 6½ tolas.

4. This plant was not manured, nor watered, nor given any special attention.

5. Seed was analysed for oil content. Figures supplied by the Late Sri M. Bhavanisankar, Oil Seeds Specialist Coimbatore are

	Sample I	Sample II	Average
Oil content	50.34	50.23	50.29
Free Fatty Acid	0.35	0.34	0.35

The full significance of these observations will become apparent if looked at against the background of the performance of the commonly cultivated varieties of the Madras and Andhra States.

1. According to Kulkarni (1959) 'In India & other Countries it is the annual type of castor on which most of the crop improvement work has been done'. The only economic strain of perennial castor is known is Co. 1 which however is only suited to elevations above 2000 ft. On the plains, according to the Oil Seeds Specialist, it yields only hollow infertile beans. In the hills, where it is grown, the yield is not more than 4½ lbs. per plant.

2. The average castor yields in Madras State is nearer 3 cwt. per acre than 4 cwt. as a pure crop. The yields in the districts of Hyderabad are even less—rarely more than 2 cwt. per acre.

3. The yields of the perennial variety which is the subject of this note are likely to be as follows:—

Spacing 6' × 6'—number of plants per acre 1,200—Potential 6,000 lbs. in the first year.

Spacing 6' × 10'—number of plants per acre 700—Potential 3,500 lbs. in the first year.

In the second year the potential yields at 10 lbs. per plant will be 12,000 and 7,000 lbs. respectively for the two spacings.

4. The above are deductions from a plant receiving no special attention. Experiments with fertilisation started this season show that the plants give an astonishing response. The yields, therefore, can be boosted considerably by moderate fertilisation.

These yields no doubt, appear fantastic and the scientific observer will say 'One swallow does not make a summer', but this non-scientific worker counters this by replying "even a bit of straw can show which way wind blows". All that the writer desires is that a few people should give this variety a fair trial. A single row of plants alongside one's boundary fence or compound wall will not take up much space or interfere seriously with other gardening activities. As a pound contains about 450 seeds one ounce of seed will be enough for a fair trial. The author will be pleased to send an ounce of seed to anyone who desires to give this castor a fair trial or some can be obtained from Dr. B. W. X. Ponnaiya, Professor of Plant Genetics, Agricultural College, Coimbatore-3.

S. R. SAVOOR.

Preliminary Studies on the Relationship between Sorghum Population and Yield

The yield per acre of a crop is the product of population and the average yield per plant. The density of the population influences the yield per plant and its effect varies with the nature of the crop and the conditions under which it is grown. In the case of sorghum grown under adequate manuring and irrigation, it has been observed that closer spacing results in higher yields. With a view to study the differential effects of varying populations on the yield of the irrigated sorghum crop, an observational trial was conducted at the Millet and Pulses Breeding Station Coimbatore in summer 1959.

A field of average fertility was chosen and the plots were manured with 40 lb. of Nitrogen in the form of ammonium sulphate and 30 lb. of P_2O_5 in the form of super phosphate applied as a basal dressing over five tons of farm compost per acre. The irrigated sorghum strain Co. 18 was used. Seeds were sown in the nursery and the seedlings were pulled out after 25 days and planted in the field with spacings of 2 links, $1\frac{1}{2}$ links and 1 link between rows and $\frac{1}{2}$ link, 1 link and $1\frac{1}{2}$ links within row. The particulars of the treatments and the yield of grain recorded in each are furnished below.

Spacing within row	Grain yield in lb.		
	$\frac{1}{2}$ link	1 link	$1\frac{1}{2}$ link
Spacing between row			
1 link	2932	2042	2010
$1\frac{1}{2}$ links	2208	1781	1600
2 links	1700	1493	1375

Population.

$1 \times \frac{1}{2}$ link spacing	2.00 lakhs of plants per acre.	
$1\frac{1}{2} \times \frac{1}{2}$ do.	1.33 do.	
$2 \times \frac{1}{2}$ do.	1.00 do.	
1×1 do.	1.00 do.	
$1 \times 1\frac{1}{2}$ do.	0.66 do.	
$1\frac{1}{2} \times 1$ do.	0.66 do.	
2×1 do.	0.50 do.	
$2 \times 1\frac{1}{2}$ do.	0.44 do.	

It may be seen from the data presented above that the grain yield of plants spaced at two links between rows ranged from 1375 lb. to 1700 lb. of grain per acre while in the case of 1 link spacing between rows the yields ranged from 2010 lb. to 2932 lb. per acre. The difference in



yield between the two spacings shows the favourable effect of narrowing the space between rows from 2 links to one link. It may also be observed that closer spacing of plants within row to $\frac{1}{2}$ link recorded higher yields in all the three spacings between rows and the maximum yield was obtained with a spacing of 1 link between rows and $\frac{1}{2}$ link within the row at a population of two lakhs of plants per acre. An increase in population from 44,000 plants per acre to 2,00,000 plants resulted in 112 per cent increase in yield of grain thus providing sufficient evidence to prove that higher yields are obtained when closer spacings are adopted both between rows and within rows.

In order to study the effect of spacing on plant characters, 25 plants in each of the closely spaced and wider spaced populations were taken at random and measurements on plant height, leaf area, panicle size, peduncle thickness and number of grains per panicle were recorded and compared with those noted for a population of 50,000 plants per acre i. e. 2 links $\times$ 1 link spacing which represents the spacing normally adopted by farmers of Coimbatore district. The data collected in the three treatments are furnished below.

Spacing	Population in lakhs	Height in cm.	Leaf area (length in cm. $\times$ breadth in cm.)	Panicle size length in cm. $\times$ breadth in cm.	Peduncle thickness in cm.	No. of grains per panicle	Grain yield per acre in lb.
1	2	3	4	5	6	7	8
Close spacing ($1 \times \frac{1}{2}$ link)	2.00	161.2	275	45.4	0.8	653.8	2932
Normal spacing (2×1 link)	0.50	163.2	282	59.2	1.0	849.1	1493
Wider spacing ($2 \times 1\frac{1}{2}$ link)	0.44	156.8	253	67.2	1.0	1133.4	1375
Range	0.44 to 2.00	156.8 to 163.2	253 to 282	45.4 to 67.2	0.8 to 1.0	653.8 to 1133.4	1375 to 2932
Range expressed as percentage	100 to 455	100 to 104	100 to 111	100 to 148	100 to 125	100 to 173	100 to 213

It may be seen that the effect of population was more marked in the case of panicle size and number of grains per panicle than in other plant characters. It is interesting to note that in spite of 48%, and 73% increases in panicle size and number of grains per panicle, wider spaced plants have actually given the lowest yield of grain. The high yield of

grain recorded in the closely spaced crop should therefore be attributed to the greater number of earheads produced consequent on the higher plant population per acre.

From the above studies it may be concluded that narrowing the spacing of plants from 2 links to 1 link between rows and from 1 link to $\frac{1}{2}$ link within the row resulted in higher yields of grain in the irrigated sorghum crop. Further it is seen that the greater number of panicles harvested per acre contributes towards the increase in grain yield per acre. Though there was considerable reduction in the size of panicle and number of grains per panicle in the thickly populated crop it is the increase in the number of earheads that actually contributed to the higher yield of grain recorded in the case of the close planted crop.

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A. SUBRAMANIAM,
K. MEENAKSHI,
M. S. THANGAM.

Preliminary studies on Clump method of cultivation in Sorghum as compared to the local method (Broadcasting) and the Farm method (sowing in lines).

It has been claimed that in sorghum the adoption of a wider spacing within and between rows and the sowing of 12 seeds per hole which are thinned in stages to four plants per clump registers higher yields of grain as compared to the local practice of sowing closer and thinning to one seed per hole.

With the object of studying the comparative merits of this method under Coimbatore conditions, an experiment was laid out in which three treatments viz.,

- i. **Farm method:** Sowing in lines 2 links apart and thinning to one plant per hole one link apart.
- ii. **Clump method:** Sowing in clumps 3 links between lines and $1\frac{1}{2}$ links within the line and thinning in stages to 4 plants per hole.
- iii. **Broadcasting** (local practice) where the seed is sown broadcast at the rate of 20 lb. per acre and later thinned to one plant per hole.

were tried in two successive seasons in 1957 and 1958 using the Periamanjil strain Co. 1. The field was manured with farm yard manure at 5 tons per acre, 30 lb. P, O, in the form of super phosphate and 40 lb. N in the form of ammonium sulphate. The farm yard manure and super phosphate were applied as basal dressing. Ammonium sulphate was applied in two stages half as a basal dressing and half as top dressing. The crop was given one protective irrigation i. e. an initial irrigation after sowing after which the crop was treated as a rainfed one.

The results of the trial are tabulated below :

Particulars	Acre yield of grain in lb.		Yield of grain expressed as percentage of standard	
	1957	1958	1957	1958
Farm method	... 1905	946	122	133
Clump method	... 1802	831	116	117
Broadcast (standard)	... 1560	709	100	100

In grain yield, the farm method registered the highest yield in both the years of trial, the increase being 22 and 33 per cent respectively over the standard i. e. broadcast method while the clump method registered 16 and 17 per cent more grain respectively.

It may be concluded from the results presented above that under Coimbatore conditions, sowing of Periamanjil Cholam 2 links apart with 1 link between plants is the most economic.

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Some comments on an article published in the Journal of the Linnean Society of London, Botany, Vol. LV, No. 359, pp. 302—312 on the Taxonomy and origin of the cultivated bananas by N. W. Simmonds and K. Shepherd, Banana Research Scheme, Imperial College of Tropical Agriculture, Trinidad.

The author of this article was in correspondence with Mr. N. W. Simmonds on the article referred to above.

It is stated on page 308 of the Journal under Taxonomy that the two Linnean species *Musa paradisiaca*, L. and *Musa sapientum*, L. can both be identified with reasonable certainty with edible banana clones; the first is the Plantain and the second is Silk Fig.

A line as such cannot be drawn between *M. paradisiaca*, L. and *M. sapientum*, L. since many characters of these two species overlap and are intermingled. For example in *M. paradisiaca*, L. the male flowers persist on the rachis and it is also true in many typical varieties of *M. sapientum*, L. (Jacob 1952, p. 31)* Hence it is clear that *M. paradisiaca*, L. and *M. sapientum*, L. cannot both be identified with reasonable certainty with edible banana clones.

It is stated on Page 307, last but one line, of the same article that *Musa balbisiana* Colla. is indigenous to Peninsular India. But it is found only under cultivation here, while *Musa acuminata* and other forms of the same (*Musa kattuvazhana*, Jacob) are largely found growing wild in different parts of the Peninsular India which the authors of the article mention as unrecorded (Jacob 1952, pp. 129 and 130). Hence the conclusions arrived at in the article cannot be correct (Journal p. 308 para 1).

The authors of the article suggest *paradisiaca* as the specific name for most of the edible banana clones, after they have rejected the two Linnean *Musa* species, *Musa paradisiaca*, L. and *M. sapientum*, L., both being of hybrid origin (Journal, p. 308, last para). Further, the characters on which they are founded by Linnaeus, viz., persistent male flowers for *M. paradisiaca* and deciduous male flowers for *M. sapientum*, L. may appear very good for classification. But the author of this article has proved that they are unstable characters. Hence he has ignored both these characters in his grouping of Madras banana varieties. He has included banana varieties, Kullen and Nendrapadaththi, having persistent male flowers, along with many varieties of edible banana clones with deciduous male flowers (Jacob, 1952, p. 31, Kaali group). If Linnaeus had

* Jacob, K. Cherian 1952: Madras Bananas, Government Press, Madras, pp. 1-228.

known that those characters were unstable, he would not have taken those characters for his classification. These two Linnean specific names of *Musa* should not, therefore, be taken into consideration in any naming of edible banana clones.

Dr. E. E. Cheesman, who was formerly doing research on bananas at Trinidad in a letter dated 27—4—1960, to the author stated that "the rules imply that one must use the first specific name applied to *Musa* in or after Species Plantarum 1753. That is undoubtedly *paradisiaca*".

Cheesman also writes that the original diagnosis of *Musa paradisiaca* said nothing about persistent male flowers. The whole description was *Musa* with a nodding spadix.

The illustration cited for *Musa paradisiaca*, L. (Kew Bulletin 1948, p. 152, Plate 1, Fig. 1) is that of the plantain of the Europeans and Americans and is definitely of the Madras Nendran (Jacob 1952, p. 42) which is certainly an hybrid and, therefore, the name *paradisiaca* should not be given for any edible banana clone as per rules of Botanical Nomenclature even though it was founded by Linnaeus without knowing that the persistent nature of the male flowers was not a stable character.

The author is of opinion that in those early days Linnaeus thought that the banana which he had identified in the year 1753 was the only one with nodding spadix to distinguish it from *Heliconia behai* which has upright spadix. Hence he should have thought, for the sake of brevity, that there was no necessity to add any more characters to his *M. paradisiaca*, L. Linnaeus should have noticed that this banana had the male flowers persistent, contrary to all the other plants he had described previously, where the male flowers either drop off or dry up. That is why when he saw the drawing of another banana by Ehret, some years later, with nodding spadix and the male flowers deciduous, he remembered that his *Musa paradisiaca*, L. had persistent male flowers. Therefore he described the one with deciduous male flowers as *M. sapientum*, L. and the other with persistent male flowers as *M. paradisiaca*, L. When there were only two banana clones with nodding spadices the characters, persistent and deciduous male flowers are quite enough for separating them into two different species.

Since these banana clones are of hybrid origin and the differentiating characters are not stable, the species founded on them should be rejected. When the species is rejected, of course, the name of the species also should be rejected.

One or more botanical names are necessary for the various varieties, forms and types of the edible banana clones of the world. The author has combined the two Linnean edible banana species into one, viz., *Musa*

sapidisiaca, Jacob, nom. nov. taking the first part of *sapientum* and the last part of *paradisiaca* (Jacob 1952, pp. 10 and 11). The male flowers in this species may be persistent or deciduous and importance is given to stable characters. *Musa sapidisiaca* does not represent any edible banana clone of any hybrid origin. Therefore, the name *Musa sapidisiaca* cannot be rejected. It is a comprehensive name combining the characters of both *Musa paradisiaca* and *M. sapientum*, L. No other comprehensive name is available in all banana literature on the edible banana clones.

It is, therefore, desirable to consider most of the hybrid edible banana clones as varieties or forms of *Musa sapidisiaca*, nom. nov.

Cherian Road,
Coimbatore.
25-8-1960 }

K. CHERIAN JACOB
Life Fellow of the Linnean Society of London.

College and Estate News

Hon'ble Srimathi Tarakeswari Sinha, Union Deputy Minister for Finance, visited the Agricultural College and Research Institute, Coimbatore on 27-8-1960. She was taken round the Institute and the various Breeding Sections.

The College closed for the Michaelmas Holidays on 25-9-1960 to reopen on 4-10-1960.

The Madras Agricultural College won the Hockey match against the Government College of Technology with a comfortable margin of 3 goals in the Inter-Collegiate League Tournament.

Sri Noel Iruthiaraj of the I year B.Sc. (Ag.) was selected to represent the University of Madras in Football. Our congratulations to him.

The Third Annual Conference of the Upper Subordinates of the Agricultural Department was held on 22-8-1960 under the presidentship of Sri D. Marudarajan, Retired Government Mycologist. Sri Subbanna Gounder, M.L.A., addressed the gathering exhorting the Upper Subordinates to keep up striving towards more food production.

Sri M. V. Jayaraman, President of the Association, thanked the Government for the revised pay scales and requested that due weightage should be given to the senior members of the cadre. Delegates from all over the State attended the Conference and took part in the proceedings. Sri Khaleel Ahmed, Secretary, proposed a vote of thanks.

Award of Ph. D. Degree: Sri P. Madhava Menon, Research Assistant, Faculty of Plant Breeding and Genetics was awarded the degree of Ph. D. by the University of Madras.

MESSAGES

Received During the 43rd College Day and Conference

DR. RAJENDRA PRASAD, *President of India, New Delhi.*

I send my best wishes to the Agricultural College and Research Institute, Coimbatore on the occasion of opening of New Building of its Post-Graduate Centre. With this additional amenity I feel sure that this College which has already contributed so much to modernisation and improvement of Agriculture in India will be able to give still better account of itself in the interest of the Nation's prosperity.

SRI JAWAHARLAL NEHRU, *Prime Minister of India, New Delhi.*

I am happy to learn that a new building for the Post-Graduate Centre of the Agricultural College will be opened at Coimbatore soon. Last year I visited this Agricultural College and was much impressed by the fine work which was being done there. It is pleasing, therefore to note that its activities are progressively expanding. My good wishes on this occasion.

SRI BISNURAM MEDHI, *Governor of Madras.*

I am glad to know that the new building for the Post-Graduate Centre of the Agricultural College and Research Institute, Coimbatore will be opened by the Union Minister for Food and Agriculture on 19th August 1960.

India is predominantly an agricultural country and the Government at the Centre and in the States have formulated and executed several schemes which will increase our agricultural production to feed the growing population of our country. I understand that this Post-Graduate Centre is one of the five Regional Post-Graduate centres established as a co-operative effort between the Government of India and the respective State Governments. It is good to note that candidates from all over India will be admitted into this centre which will provide necessary facilities for our students to undertake research work here itself instead of going abroad.

On the occasion of the opening of the new building for the Post-Graduate centre, I send my greetings and good wishes to the staff and students for all health, happiness and prosperity.

SRI K. KAMARAJ, *Chief Minister of Madras, Madras.*

In modern times research plays the main role in the advancement of man in all spheres. It is all the more important in the agricultural field, for, his daily bread should come from the land. The progress made in the field of agriculture should also keep abreast of the developments in other spheres. I am glad to note that the Agricultural Research Institute at Coimbatore will play a leading role in the advancement of agriculture in the State. This Regional Institute is one, of which we in Madras can be very proud. I wish the Post-Graduate Centre a long and fruitful life.

SRI C. SUBRAMANIAM, *Finance Minister of Madras, Madras.*

Agriculture is the base for all progress. Modern and scientific methods in agriculture should be taken up by the agriculturists if the agricultural industry is to yield good results. Agricultural Research therefore is of prime importance. I am glad to learn that the Post-Graduate centre of the Agricultural College and Research Institute, Coimbatore provides training in subjects like Agronomy and Soil Science. I hope that the Research Institute will grow from strength to strength. I send my best wishes for the success of the function to be held to declare open the new building for the Post-Graduate Centre.

SRI A. M. THOMAS, *Deputy Minister for Food, New Delhi.*

I am glad to learn of the opening of the new building of the Post-Graduate Centre of the Agricultural College and Research Institute, Coimbatore, on the 19th August, 1960 by Sri S. K. Patil, Union Minister for food and Agriculture.

The reputation which the Coimbatore Agricultural College and Research Institute has enjoyed for many years as a centre for higher education in agriculture and for agricultural research is too well-known to need any emphasis. Both the President of India, during his visit to the College in 1958, and the Prime Minister of India during a visit in the following year, had stressed the importance of research and education in agriculture, at the same time indicating the need to orient our research and educational programmes to be in close contact with the practical problems of the farmer. Faced as we are with a continuing problem of deficit in food production, the role of agricultural scientist, educationist and students gains a great deal of emphasis. During the Third Plan our planners have set the target of 105 million tons of food production. This is not going to be an easy task. It is certainly one which calls for the very best efforts that the agricultural scientists, extension workers, students and administrators can possibly put forth. It is my hope that the Coimbatore Agricultural College and Research Institute with all its past reputation and with the growing facilities that have been made available to it in recent times, would justify the confidence that the country has reposed in it, by putting in the most significant contribution towards our declared goal of self-sufficiency in food production, both by training skilled man-power and by increasing tempo of practical research in the field of agriculture.

I send my very best wishes to the Institute on this important occasion of the opening of a new building for adding facilities for higher education in agriculture.

SRI M. V. KRISHNAPPA, *Deputy Minister for food and Agriculture.*

Your invitation. Wish function success.

DR. M. S. RANDHAWA, *Vice-President, I. C. A. R. New Delhi.*

The Regional Post-Graduate Agricultural Research Institute at Coimbatore was opened by the President of India on the 10th August, 1958. This was the first of the regional post-graduate training centres to be sponsored and established with the aid of the Central Government. It marked the implementation of a very important recommendation of the First Joint Indo-American Team on Agricultural Research and Education. The Second Joint Indo-American Team has only recently submitted its recommendations to the Government of India emphasising or endorsing much of what has been said before by the First Team in regard to the need for better and increased facilities for higher education in agriculture. As the

Minister for food and Agriculture, Government of India, said in August 1958, Madras has always been in the vanguard for progress in agricultural field and it is a matter for gratification that in the field of post-graduate education also Madras has maintained a lead over many other States, making a significant contribution towards the Nation's effort to meet technical man-power requirements. This Institute is indeed an evidence of the spirit of co-operation and mutual help, because here 50% of the seats are offered to candidates hailing from all parts of India, outside Madras State. The responsibility of the Institute in maintaining a very high standard of post-graduate education is indeed very great, but I have no doubt that this Institute will maintain and improve upon the prestige which it commands at present, so that it may continue to receive the appreciation and admiration of all those who have the interest of agriculture and agricultural education at heart.

I wish to add my congratulations to the Dean, Dr. S. Krishnamurthi and the staff of this Institute as well as to the Madras Government for the high traditions that they have built up and have striven to maintain, in the field of Agricultural Education. I hope they will be a source of inspiration to others.

MR. RAYMOND DAVIS, *Food and Agricultural Officer, American Embassy, New Delhi.*

May I take this opportunity to offer my congratulations on the opening of the new building for the Post-graduate Centre at your Institution on August 19, 1960.

This event marks another important step in the development of a stronger agricultural education and research programme for India. It is such institutions that must play a leading role in helping to improve the agriculture in India.

The cultivators of India are in dire need of technical information to increase their production and improve their living conditions. I am sure that your new Post-Graduate Centre will, in the years ahead, contribute to the needs of the cultivators who are the foundation of India's strength. By offering opportunities for post-graduate study with the objective of not only granting M. Sc., or Ph. D., degrees, but turning out graduates technically equipped and willing to help solve the agricultural problems of India, your new Post-Graduate Centre will make an immeasurable contribution to agricultural improvement.

Again, may I congratulate you and wish your new Centre all possible success.

MR. RALPH CUMMINGS, *Field Director, Rockefeller Foundation.*

Heartiest Greetings on occasion of opening Post-graduate Centre Building by Minister S. K. Patil, to-day. Your institution has established distinguished reputation for leadership in Agricultural Research and education and I am confident will continue to Pioneer in these respects. Development of highest quality programme of Post-Graduate education within India is of greatest importance in training leadership and accelerating agricultural and economic progress. Best wishes for success in this Programme.

SIR T. S. VENKATARAMAN, *Madras.*

The Coimbatore Agricultural College and Research Institute has many landmarks to its credit. Its sugarcanes are cultivated in many parts of the world. May it continue to grow rapidly and flourish as it has hitherto done, in the Post-graduate field also.

DR. B. P. PAL, *Director, I. A. R. I., New Delhi.*

On the occasion of the opening of the new building for the Post-Graduate Centre of the Agricultural College and Research Institute, Coimbatore, I take the opportunity of sending my very best wishes for the progress of the Centre. The Agricultural College and Research Institute at Coimbatore have a great tradition and I have no doubt that the Post-graduate Centre will also become equally noted for its high standard of training.

With kind regards.

JUSTICE HEGDE, *Bangalore.*

Hearty congratulations. Wish the institution Glorious future.

DR. R. NAGAN GOWDA, M. L. A., *Hospet and former Minister for Agriculture, Madras.*

Let me congratulate you on the occasion of opening of the New Building for the Post-graduate Centre of the Agricultural College and Research Institute, by Sri S. K. Patil, Union Minister for Food and Agriculture.

I am sure the work of this Institution will help to realise the desire of the Union Minister to see that India grows all its food requirements.

I am happy that hereafter our agricultural graduates desirous of obtaining higher training leading to the degrees of M. Sc., and Ph. D., need not go abroad but come to your institution.

I wish it all success.

SRI MAHALINGAM, *Pollachi.*

Wishing the function every success.

SRI D. VISWANATHA REDDY, *Director of Agriculture, Andhra.*

I am very happy to note that Sri S. K. Patil, Union Minister for Food and Agriculture will be opening the new building for the Post-Graduate Centre of the Agricultural College and Research Institute, Coimbatore. I am glad that the Coimbatore Research Institute which is well known in the country for the very good work it has done during the last 50 years is making rapid strides in the development of Post-Graduate education. Having been associated with the Institute for some time, I am particularly proud of its achievements and the programme envisaged for further development of Post-Graduate education in new subjects shortly. I am confident that the Institute will have a bright future under your able guidance. I wish the function all success.

SRI T. M. NARAYANASWAMI PILLAI, *Vice-Chancellor, Annamalai Nagar.*

Thank you very much for your invitation to attend the Opening Function of the new building for the Post-graduate Centre of the Agricultural College and Research Institute, Coimbatore.

The Coimbatore Agricultural College is one of the best Agricultural Colleges in India and usefulness of this Institute is considerably enhanced by the addition on the Post-graduate block. Research is essential for progress in any Department but research in Agricultural sector is most essential, especially at a time like this. It is with the aid of research alone that we could solve the most pressing problems confronting us in this sector. It is a happy augury that the building is being opened by Sri S. K. Patil, Union Minister for Food and Agriculture, whose remarkable dynamism and drive are sure to solve all our difficulties and problems.

May the Institute grow from strength to strength and prove ever more and more useful to our country.

PROFESSOR T. S. SADASIVAN, *University of Madras.*

I wish to associate myself with other messages of Greetings and Good Wishes that you will be receiving on the occasion of the opening of the Post-graduate Block by the Hon'ble Union Minister for Food and Agriculture under the presidentship of our distinguished State Minister for Home and Agriculture.

THE SECRETARY, *Gondaligram.*

Wishing the function every Success.

Crop and Trade Reports

Paddy—Third and Final Forecast Report, 1959—'60—Madras State: The area sown with paddy in the Madras State in 1959—'60 is estimated at 5,736,000 acres. Compared with the area of 5,712,000 acres according to the final forecast for the previous year the current year's estimate shows an increase of 0.2 per cent. The present estimate shows an increase of 2.6 per cent when compared with the average area of 5,563,000 acres for the five years ended 1958—'59. (Statements showing the districtwise estimates of area and production of rice separately for first, second and third crops are appended). At time of the report, condition of the standing crop was reported to be fair in all the districts except in parts of South Arcot, Tiruchirappalli, North Arcot, and Chingleput districts. Paddy crop in Gingee taluk of South Arcot district, in Alangudi, Kulathur and Thirumayam taluks of Pudukkottai division of Tiruchirappalli district and in some parts of Wallajah, Tirupattur and Wandiwash taluks of North Arcot is reported to be withering for want of supply in the irrigation sources while crop in certain villages in Ponneri taluk of Chingleput district have turned Shavi. Pest attack on paddy crops from some parts of Chavvar and Polur taluks of North Arcot district and in some places in Tiruchirappalli and Chingleput district, was reported. The Agricultural Department is taking preventive measures.

The total yield in terms of rice is estimated at 3,406,000 tons on the basis of preliminary results of crop-cutting experiments Compared with the yield of 3,298,000 tons according to the final forecast report for the previous year, the current year estimate shows an increase of 3.3 per cent. Compared with the average yield of 3,087,000 tons for the five years ended 1958—'59, the present estimate shows an increase of 10.3 per cent. The average wholesale price of rice II sort per standard maund of 82-2/7 lb. as reported from certain important market centres on 5th, February 1960 was Rs. 18.39 at Cuddalore, Rs. 18.47 at Madurai, Rs. 19.00 at Nagapattinam and Nagercoil, Rs. 19.32 at Tiruchirappalli and Rs. 20.00 at Vellore. Compared with the prices which prevailed during the corresponding period of the previous year, the current prices reveal a fall of 0.6 per cent at Cuddalore, 2.5 per cent at Nagercoil, 7.9 per cent at Madurai and an increase of 3.8 per cent at Nagapattinam, 5.3 per cent at Vellore and 8.5 per cent at Tiruchirappalli.

Tobacco—Third and Final Forecast report, 1959—'60—Madras State: The area sown with tobacco in the Madras State, in 1959—'60 is estimated at 38,600 acres (15,600 hectares). Compared with the provisionally recorded area of 35,700 acres (14,400 hectares) according to the Season and Crop Report for the previous year, the present estimate reveals an increase of 8.1 per cent. Compared with the average area of 43,500 acres (17,600 hectares) calculated for the five years ending with 1958—'59, it is a decrease of 11.3 per cent. The area under the crop is nil or negligible in the districts of Chingleput and the Nilgiris; the area estimated is the same as that for the previous year in the districts of North Arcot and Tirunelveli. An increase in area is estimated in all the other districts of the State. The condition of the standing crop is reported to be generally fair in all the districts of the State except in parts of Tiruchirappalli where the crop is reported to have been affected by pest.

The seasonal factor for the State as a whole works out to 96 per cent of the normal as against 91 per cent of the normal for the previous year. On this basis, the total yield works out 22,300 tons (22,700 tonne) of cured leaf, as against 20,200 tons (20,500 tonne) of cured leaf provisionally estimated for the Season and Crop Report for previous year representing an increase of 10.4 per cent. Compared with the average yield of 24,200 tons (24,600 tonne) of cured leaf calculated for the five years ending with 1958—'59, the present estimate is a decrease of 7.9 per cent. The

wholesale price of tobacco (air cured) per standard maund of 82-2/7 lb. or 3300 tolas as reported from certain important market centres on 13—5—60 was Rs. 87.22 (Rs. 138.00 per quintal) in Erode and Rs. 66.83 (Rs. 176.37 per quintal) in Tiruppur. Compared with the prices which prevailed in the corresponding period of the previous year, these prices reveal an increase of 40.5 per cent in Tiruppur and 32.5 per cent in Erode.

Maize—First and final Report 1959—'60 Madras State: The area sown with maize (Zea Mays) in the Madras State in 1959—'60 is estimated at 13,000 acres (5,200 hectares). Compared with the provisional area of 11,800 acres (4,800 hectares) according to the Season and Crop Report for the previous year, this shows an increase of 10.2 per cent. Compared with the average area of 14,000 acres (5,700 hectares) calculated for the preceding five years, the current year's estimate shows a decrease of 7.1 per cent. The area under the crop is nil or negligible in the districts of Chingleput, Nilgiris and Kanyakumari. An increase in area is estimated in the districts of Coimbatore, Tiruchirappalli and Thanjavur and a decrease in Ramanathapuram district. The area estimated is the same as that for the previous year in the districts of South Arcot, North Arcot, Salem, Madurai and Tirunelveli.

The crop has been or is being harvested. The Seasonal Factor for the State as a whole works out to 99 per cent of the normal as against 98 per cent of the normal estimated for the previous year. On this basis the total yield works out to 5,200 tons (5,200 tonne) of threshed grain as against 5,100 tons (5,200 tonne) of threshed grain provisionally estimated for the previous year representing an increase of 11.8 per cent. Compared with the average yield of 6,200 tons (6,300 tonne) of threshed grain, calculated for the five years ended 1958—'59, the current year's estimate shows a decrease of 8.1 per cent.

Gingelly (Sesamum) crop—Fourth and Final Report—1959—'60—Madras State: The area sown with gingelly (sesamum) in the Madras State in 1959—'60 is estimated at 337,800 acres (136,700 hectares). Compared with the provisional area of 358,100 acres (144,900 hectares) according to the Season and Crop Report of the previous year this is a decrease of 5.7 per cent. The current year's estimate shows a decrease 0.1 per cent when compared with the average area of 338,000 acres (136,800 hectares) calculated for the five years ended 1958—'59. The area under the crop is negligible in the Nilgiris district. An increase in area as compared to the previous year is estimated in Thanjavur, Madurai, Ramanathapuram and Tirunelveli districts and a decrease in the other districts of the State.

The crop has been or is being harvested in most districts of the State. The Seasonal Factor for the State as a whole works out to 98 per cent of the normal as against 97 per cent of the normal estimated for the previous year. On this basis the total yield works out to 43,900 tons (44,600 tonne) as against the provisional yield of 55,900 tons (46,600 tonne) according to the Season and Crop Report for the previous year, representing a decrease of 44 per cent. Compared with the average yield of 43,000 tons (43,600 tonne) calculated for the preceding five years, the current year's estimate shows an increase of 2.1 per cent. The wholesale price of gingelly seed for standard maund of 82-2/7 lb. as reported from certain important market centres on 8th April, 1960 was Rs. 34.70 (Rs. 92.97 per quintal) of 100 kg.) at Tiruchirappalli, Rs. 36.50 (Rs. 97.79 per quintal) at Vellore, Rs. 39.27 (Rs. 105.21 per quintal) at Tirunelveli, Rs. 40.11 (Rs. 107.46 per quintal) at Madurai and Rs. 41.44 (Rs. 111.03 per quintal) at Coimbatore. Compared with the prices which prevailed during the corresponding period of the previous year, the current prices reveal a rise of 14.1 per cent at Vellore, 16.7 per cent at Tiruchirappalli, 17.4 per cent at Tirunelveli, 24.0 per cent at Coimbatore and 33.3 per cent at Madurai.

Cholam (Jowar) — Third and final Report — 1959-'60 — Madras State: The area sown with cholam (Jowar) in the Madras State in 1959-'60 is estimated at 1,750,900 acres (708,500 hectares). Compared with the area of 1,742,900 acres (705,900 hectares) estimated for the final forecast report for the previous year, the current year's estimate shows an increase of 0.5 percent. Compared with the average area of 17,93,800 acres (725,900 hectares) calculated for the five years ended 1958-'59, the present estimate shows a decrease of 2.4 per cent. A decrease in the area in the current year is estimated in Chingleput, North Arcot and Madurai districts as compared with the previous year and an increase in area in all the others districts of the State except the Nilgiris district where the area estimated is the same as that for the previous year.

The main crop has been harvested in most districts of the State. The total yield of cholam (both Kharif and rabi crops) works out to 534,900 tons (545,400 tonne) on the basis of preliminary survey results as against 516,200 tons (524,500 tonne) estimated for the final forecast report for the previous year representing an increase of 4.0 percent. This is an increase of 6.1 percent when compared with the average yield of 506,100 tons (514,200 tonne) calculated for the five years ended 1958-'59. The average wholesale price of cholam per standard maund of 82-2/7 lb as reported from certain important market centres on 18-3-60 was Rs. 15.39 (Rs. 38.55 per quintal of 100 Kg) at Salem, Rs. 15.03 (Rs. 40.27 per quintal) at Madurai, Rs. 15.75 (Rs. 42.20 per quintal) at Coimbatore and Rs. 16.01 (Rs. 42.89 per quintal) at Tiruchirapalli. Compared with the prices which prevailed during the corresponding period of the previous year, the current year's prices reveal a fall of 1.4 percent at Madurai, and an increase of 5.0 percent at Salem, 9.0 per cent at Coimbatore and 12.5 per cent at Tiruchirapalli.

Weather Review — for August, 1960.

RAINFALL DATA (IN INCHES)

Region	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam) ...	2.7	— 1.9	10.5
	Tirurkuppam* ...	3.3	— 2.8	9.5
	Vellore ...	3.7	— 2.0	21.0
	Gudiyatham* ...	0.5	— 3.4	11.0
East Coast	Palur* ...	2.1	— 3.3	9.1
	Tindivanam* ...	3.1	— 2.4	9.9
	Cuddalore ...	4.2	— 0.6	12.8
	Nagapattinam ...	...	— 3.1	17.5
	Aduthurai* ...	0.1	— 4.0	10.2
	Pattukkottai* ...	1.2	— 3.6	16.9
Central	Salem ...	2.4	— 4.2	19.7
	Coimbatore (A. M. O.)* ...	0.6	— 0.2	4.2
	Coimbatore ...	0.2	— 1.0	6.2
	Tiruchirapalli ...	1.5	— 2.6	13.2
South	Madurai ...	1.2	— 2.9	14.2
	Pamban ...	...	— 0.6	10.5
	Koilkatti* ...	0.5	— 0.9	16.4
	Palayamcottai ...	1.3	+ 0.6	15.9
	Ambasamudram* ...	0.5	+ 0.2	19.8
	Nagercoil* ...	1.4	— 0.4	31.7
Hills	Capecomorin* ...	1.3	+ 0.5	27.9
	Kodaikanal ...	3.2	— 3.8	41.0
	Coonoor* ...	1.2	— 1.7	42.9
	Ootacamund* ...	2.6	— 2.0	24.8
	Nanjanad* ...	5.9	— 0.3	32.8

1. * Meteorological Stations of the Madras Agricultural Department.

The month began with a dry weather. For three days from 2-8-1960 scattered showers were received in Madras State. The monsoon gained strength in Kerala on 5-8-1960 with the result that either localised or scattered showers were received in Madras State for three days from 5-8-1960. Once again the weather became dry throughout the State on 8-8-1960. On 9-8-1960 scattered showers were received. For three days from 10-8-1960 the weather was mainly dry. Scattered showers were received in the subsequent three days from 13-8-1960. From 16-8-1960 to 20-8-1960 dry weather was experienced in Madras State. For four days from 21-8-1960 scattered showers were received. Then again the weather became dry on 25-8-1960 and remained so on the subsequent day as well. From 27-8-1960 to the end of the month either scattered or localised heavy showers were received in Madras State.

2. In regard to fluctuations in day temperature there was no large change. In fact, the day temperature was practically steady throughout the month except on 25-8-1960 when the day temperature was above normal in Madras State.



Review of market conditions of commercial crops in the notified areas of Madras State for the month of August, 1960.

Cotton: In this section Cotton Kapas: Pothi of 280 lbs.
Cotton lint: Candy of 784 lbs.

COIMBATORE DISTRICT: Season: The rainfall received during the month under report was 1. cm. In Coimbatore District sowings of Cotton crop have commenced in places where irrigation facilities are available. In Pollachi taluk and in some tracts of the district lands are being prepared for the sowings of cotton.

Arrivals and Transactions: Lint: On 30—7—1960 there was a stock of 10404 candies of cambodia lint in Tirupur market area. The total arrivals into Tirupur during the month (upto 27—8—1960) were 7755 candies of Cambodia and 206 candies of Karunganni which included 1253 candies of Cambodia and 76 candies of Karunganni lint locally ginned. Despatches from Tirupur were 5851 candies of cambodia and 176 candies of Karunganni lint. On 27—8—1960 there was a closing stock of 12308 candies of cambodia and 30 candies of Karunganni lint.

Kapas: On 30—7—1960 there was a stock of 6549 pothis of Cambodia and 4710 pothis of Karunganni kapas in Tirupur Market area. The total arrivals during the month (upto 27—8—1960) were 14709 pothis of Cambodia 1192 pothis of Karunganni kapas. The disposals during the month were 14666 pothis of Cambodia and 1860 pothis of Karunganni kapas. On 27—8—1960 there was a stock of 6592 pothis of Cambodia and 4042 pothis of Karunganni kapas.

Prices: The prices of cotton kapas and lint ruled steady around the level of the previous month. Traders were hesitant to make heavy commitments. Purchases were made according to requirements. Arrivals of kapas were from Salem and South Arcot districts.

Lint: The price ranges of cotton lint and kapas during the month as compared to that of previous months were as hereunder:

		August, 1960	July, 1960
Cambodia Superior quality	Rs.	931 to 980	901 to 981
Cambodia Average quality	"	830 to 890	852 to 896

Kapas:

Cambodia Superior quality	Rs.	147.50 to 164	131 to 173
Cambodia Average quality	"	100 to 135	100 to 130
Karunganni Superior quality	"	100 to 138	127 to 140
Karunganni Average quality	"	102	102 to 125

RAMANATHAPURAM DISTRICT: Season: In the first three weeks of the month witnessed hot sun and dry weather throughout the district. But during the final week of the month wide-spread rains were received throughout the district. The rainfall recorded during the month under report was 2.35 inches.

Arrivals and Transactions: Since the season had come to a close the arrivals during the month were poor and were restricted only from old stocks. In spite of the poor arrivals the kapas market ruled steady but with very little transactions in view of the cotton control order being enforced strictly from 1—8—1960. Contrary to the peak arrivals Uganda market were moderate and the prices were improved. The Karunganni seed market almost ruled steady.

Lint:

Name of Market	Opening Stock	Receipts	Disposals	Closing Stock
1. Virudhunagar	100	650	550	200
2. Sattur	50	750	600	200
3. Rajapalayam	1000	2100	1500	1600
Total	1150	3500	2650	2000

Kapas:

1. Virudhunagar	2000	4250	4500	1750
2. Sattur	...	9500	9500	...
3. Rajapalayam	1500	34500	30000	6000
Total	3500	48250	44000	7750

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Prices:

Lint:	August, 1960		July, 1960	
Karunganni lint	... Rs.	...	Rs.	980 to 990
Karunganni	...	981 to 993	..	...
Tinny Karunganni	...	...	..	...
Karunganni II crop	...	900 to 946	..	911 to 946
Tinny	...	860 to 935	..	881 to 935
Uganda certified	...	1100 to 1125	..	1100 to 1160
Uganda uncertified	...	1080 to 1106	..	1046 to 1100

Kapas:

Karunganni	...	122 to 125	..	123 to 126
Tinny Karunganni Mix.	...	83 to 125	..	100 to 118
Karunganni II crop	...	90 to 121	..	94 to 123
Tinny	...	75 to 115	..	...
Inferior quality	...	...	..	141 to 152
Uganda I quality	...	133 to 155	..	125 to 136
Uganda II quality	...	100 to 133	..	...

Cotton Seeds. (Prices in Rs./nP. per standard maund)

Karunganni	...	Rs. 14.36 to 15.65	Rs. 13.87
Tinny	...	15.33 to 15.65	.. 15.52
Uganda	...	11.58 to 11.88	.. 11.42

TIRUNELVELI DISTRICT: *Season:* The month was dry and practically no rainfall received throughout the district. Harvest of uganda cotton was proceeding in certain parts of the district.

Price: The price of Karunganni kapas varied between 95 to 125. The price of lint fluctuate between Rs. 1050 and Rs. 1100. At the end of the period it was reported that there was no transaction in lint. The price of seed varies between Rs. 43 to 46 per pothi.

SOUTH ARCOT DISTRICT: *Season:* Rainfall ranging from 3 to 5" was received in the various places of the district. These rains are expected to benefit the early sown winter crop.

Arrivals and Transactions: Arrivals of summer groundnut were heavy at Villupuram, Cuddalore and Panruti regulated Market and good at Tindivanam, Tirukoilur and Vridhachalam Markets. Arrivals of Gingelly and Cotton were on the increase at Vridhachalam and Villupuram respectively.

Prices: Prices of groundnut kernels ruled high in the first fortnight and declined in 2nd fortnight due to heavy arrivals. The prices of gingelly ranged from Rs. 68.60 to Rs. 95.30 upto the end of this month the average price of cotton kapas stood at Rs. 133.10 per pothi of 280 lbs.

II. Groundnut:

SOUTH ARCOT MARKET: Arrivals of Summer groundnut crop were heavy at Villupuram, Cuddalore O. T. and Panruti regulated markets and good at Tindivanam, Tirukoilur and Vridhachalam Markets. Prices of groundnut kernels ruled high in the first fortnight and declined in the second fortnight due to heavy flow of arrivals to some markets especially at Villupuram and in sympathy with the decline in prices of groundnut oil.

RAMANATHAPURAM DISTRICT: During the month the arrivals, sales and stock of pods and kernels in the district were as follows:

Name of Market	Opening Stock	Arrivals	Disposals	Closing Stock
Groundnut pods:				
Virudhunagar	100	650	550	200
Groundnut kernels:				
Virudhunagar	1500	1800	2000	1300

Prices: The following were the prices that prevailed for groundnut pods, kernels, oils and cake in the district during the month as compared to previous month.

	Prices in Rs./nP.	
	August, 1960	July, 1960
Groundnut pods (per Md. of 82-2/7 lbs.)	Rs. 24.00 to 25.00	23 to 25
Groundnut kernels (candy of 531 lbs.)	.. 210 to 230	200 to 235
Groundnut oil (candy of 500 lbs.)	.. 28.50 to 28.75	27.25 to 29.25
Groundnut oil cake (Md. of 82-2/7 lbs.)	.. 13.71 to 15.38	14.04 to 15.38

TIRUCHIRAPALLI DISTRICT: *Season:* Light to moderate showers we wide-spread in the district. The rains though inadequate helped in the sowings of winter groundnuts in many taluks. The early sown groundnut crop, though found to be withering for want of rains regain on receipt of rains latter.

Arrivals and Transactions: Being almost the last month of the lean season for groundnuts, arrivals of groundnuts have gone down to the lowest level. Because of this large scale crushers have withdrawn from operating in this district temporarily.

Prices: During the first fortnight the lowest and highest prices were Rs. 190/- and Rs. 252/- per candy of 531 lbs. of groundnut kernels. During the next fortnight, they were Rs. 185/- and Rs. 236/-.

Prices :

1. Bodinaickanoor :

Name of quality.	Price in Rs. nP. per lb.
(1) Extra Green	...
(2) Green	...
(3) Medium	9 to 9-90
(4) Inferior	8-86 to 9-19
(5) Seeds	10-50 to 13-00

2. Pattiveeranpatti :

(a) Sundried :	
Superior and bold	9-96 to 10-38
Medium and bulk	9-42 to 9-76
Inferior and small	8-76 to 9-48
(b) Store Green :	
Superior and bold	9-85 to 10-90
Medium and bulk	9-50 to 10-22
Inferior and small	9-00 to 9-65
(c) Splits :	
(d) Lights	6-40 to 7-82
(e) Seeds	11-00 to 12-52

3. Virudhunagar :

(1) Bold quality	10-50
(2) Smalls	8-75 to 9-00
(3) Seeds	12-50 to 13-00

Review of administrative activities of Market Committees
during August, 1960

The Market Committees of South Arcot, North Arcot, Coimbatore Ramanathapuram, Tiruchirapalli and Tirunelveli continued to function, briskly during the month under report.

Enforcement : The progress of enforcement during the month were as detailed below :

Name of Committee	Section 5 (1)		Section 5 (3)		Weighment	
	A	B	A	B	A	B
South Arcot Market						
Committee	243	1497	192	1061	197	1064
North Arcot Market						
Committee	98	1588	85	1497	31	663
Coimbatore Market						
Committee	239	1877	139	1322	21	636
Ramanathapuram Market						
Committee	147	191	124	172	91	123
Tirunelveli Market						
Committee	30	72	20	67	27	59
Tiruchirapalli Market						
Committee	120	1069	102	858	93	755

A = Licences issued during August, 1960.

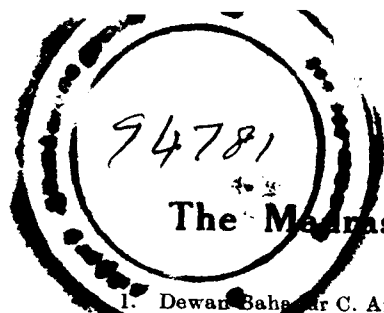
B = „ „ upto the end of this month.

Meetings : No meetings were held in any of the market committees during the month under report.

Regulated Markets : With a view to acquire a site at Rajapalayam for the establishment of a Regulated Market by the Ramanathapuram Market Committee about three sites have been selected and it is pending final selection by the Ex-officio Chairman of the committee before detail proposals are submitted. The question of opening regulated markets atleast in rented buildings either at Virudhunagar or at Aruppukottai is being examined.

Quality Analysis : Nil.

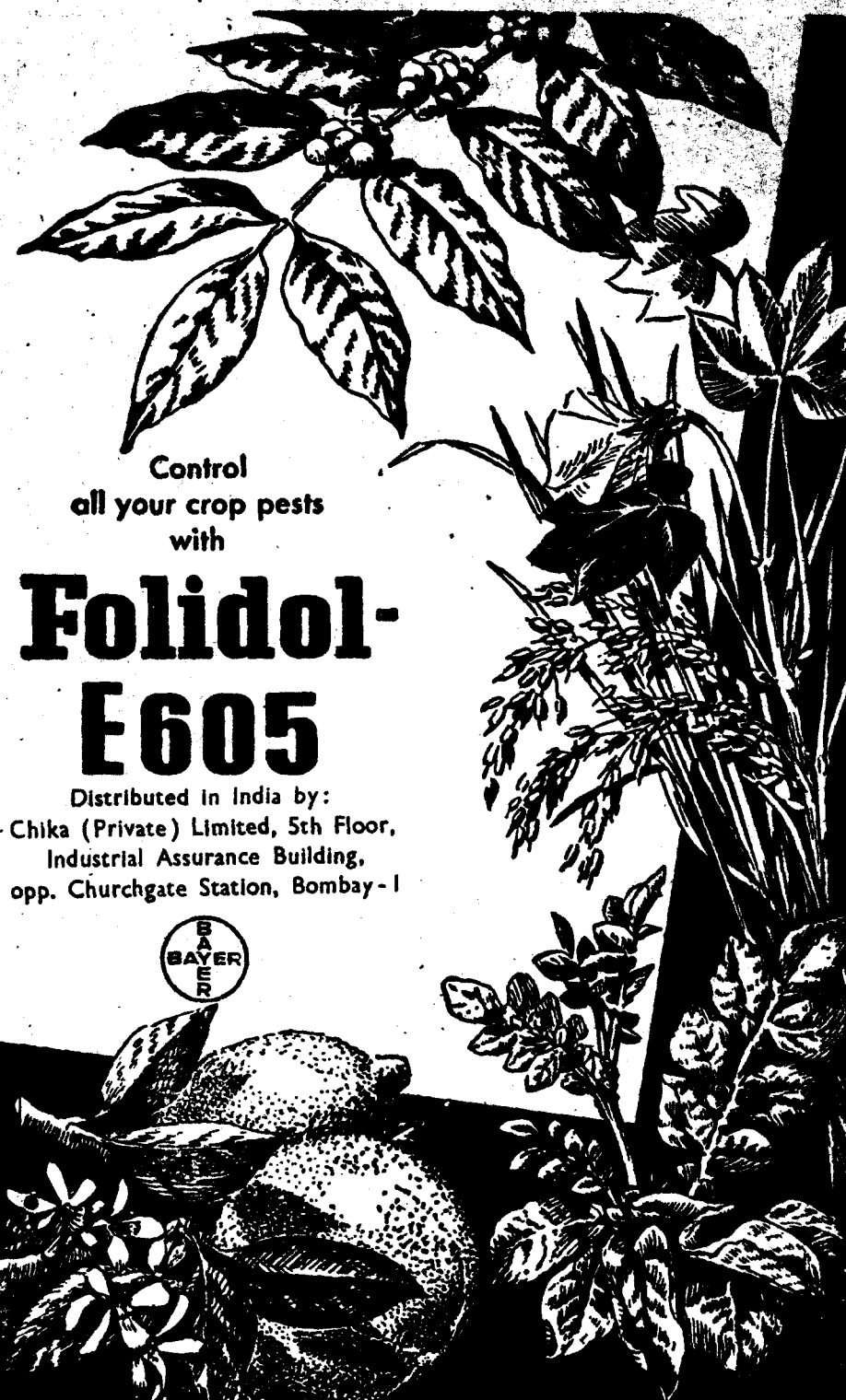
Quality Competition : Nil.



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