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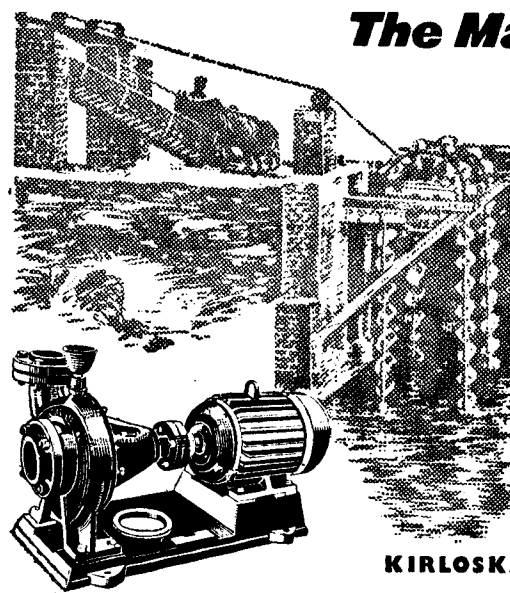
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The Madras Agricultural Journal

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Editorial

Census and Agriculture: The results of the decennial 'Great Count' taken up early this year show remarkable trends in the demographic changes during the decade just passed. The tentative figures published so far, place the population of the Indian Union at 438 millions, an increase of over 21 percent over that recorded in 1951. The increase during the previous decade was only about 12 percent. Among the States themselves the changes in population show remarkable variations; while some States like Assam and West Bengal have recorded increases of 34 and 33 percent, the Madras and Andhra States have registered only 11.73 and 15.63 percent respectively.

Within our own State of Madras, in districts like North Arcot, South Arcot, Tiruchirapalli, Tanjavur and Tirunelveli, the population increases are only under 10 per cent, while districts like Madurai, Coimbatore, Salem and Chingleput have increased between 11 and 15 per cent. Highest increases of 21 to 25% are recorded in the Madras City and the Kanyakumari district while the Nilgiris tops the list with more than 30 percent addition. We look forward to the detailed break up for some more interesting factors.

Facts brought out by the census have particular relevance to the role of the agricultural sector in an economy which is said to be at its 'take-off' stage for sustained growth and cumulative expansion. Problems of feeding the teeming millions and producing the raw materials for the humming industries have their solution only in the development of the agricultural sector. The seven year average of food grain production in India during 1953-1960 has been around 68 million tons with a minimum of 62 million tons and maximum of 73.5 million tons. The average rate of increase over this period was one million tons per annum. The food supply required by the end of the Third Plan would be in the order of 91.6 Million tons at the consumption level of 18 ounces per capita per day. Further provision for seeds and reserves may shift the production target to 110 million tons set forth by the Crisis Report.

An Announcement

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Copies of the following special conference numbers containing valuable articles are available at reduced rates. Only a few copies are on hand.

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In the light of the population growth revealed in this census, the population at the end of the Third Plan will be over 488 millions against the initial estimate of 480 millions of the Planning Commission. What would happen if we go on increasing at this pace is a legitimate question posed by thinking people. Can we feed and clothe them well and give them a better standard of living as outlined as a major objective of the Five Year Plans?

The Agricultural research, technology and extension have a vital and significant role in stepping up the production efficiency in agriculture. Thanks to the researches of agricultural scientists, and the work of the extension staff that the crop yields could now be doubled and trebled as witnessed from the achievements of the winners in crop competitions who have produced an 8000 lb. paddy crop, 6000 lb. sorghum crop and a 125 ton sugarcane crop. If more farmers in the State raised the fertility level of their soils and applied better techniques in their farming operations by using better seeds, more manures and fertilisers, adopting plant protection measures etc., our crop yields could be much increased, farm income raised and the needs of the country fully met with.

Economics of Cotton Cultivation in the Madras State

by

S. KAMALANATHAN and C. NAGARAJAN
(Madras Agricultural Department)

Introduction: Cotton is a major commercial crop of the Madras State, covering an area of 11.2 lakh acres with a total annual production of 3.6 lakh bales of lint. It comprises chiefly two commercial types—Karunganni, a variety of *desi*, almost invariably grown with the rains and Cambodia, a variety of American Cotton, first introduced from Indo-China in 1905. The latter is grown both under irrigated and rainfed conditions.

The farming systems in cotton admit division into six distinct zones or tracts based on agro-climatic complexes. The various tracts together with their acreage, regions of growth, cropping season and suitable cultivated strains are given below.

Name of the Tract	Estimated area in acres (1958-59)	Major regions of growth (Districts)	Season	Cultivated strain
A. Cambodia:				
1. Irrigated Winter Cambodia	2,00,000	Coimbatore, Salem, Tiruchirapalli & parts of Madurai	August-Sep. to March April	M.C.U. 1
2. Unirrigated Cambodia	2,76,400	Parts of Madurai, Coimbatore & Salem.	October-November to April-May.	M.C.U. 1
3. Summer Cambodia	65,900	Ramanathapuram, Tirunelveli, Madurai and South Arcot.	February-March to July-August, December January to June - July (in South Arcot)	M.C.U. 2

Name of the Tract	Estimated area in acres (1958-59)	Major regions of growth (Districts)	Season	Cultivated strain
4. Cotton in rice-fallows	7,400	Tiruchirapalli, Thanjavur, South Arcot and Chingleput.	February-March to June-July	P. 216 F
B. Karunganni :				
1. Central Karunganni Tract	1,76,700	Coimbatore, Salem, Tiruchirapalli & Madurai.	October-November to May-July.	K. 5
2. Southern Karunganni Tract	3,96,600	Ramanathapuram, Tirunelveli & parts of Madurai	October-November to May-June.	K. 2

(Based on Fifth and Final Forecast Report 1958-59, Madras State).

Note: The area under cotton in rice-fallows offers scope for extension.

The cost of cultivation in each tract is discussed in the article giving suggestions for enhancing the net income by reduction in the cultivation charges and/or by effecting increase in yield. The costs of cultivation were gathered from the cultivation sheets maintained in Government Farms and by enquiry among cotton growers.

Cost of Cultivation: The cultivation charges vary depending upon the agro-climatic complex of the cotton zones and the variety of cotton grown. The details on the cost of cultivation and the net monetary return realised in each zone are given in Table 1.

Among the four categories of Cambodia zones, the summer Cambodia yields the highest monetary return mainly on account of (1) the better quality lint of MCU. 2 which is valued higher than either MCU. 1, cultivated in the Winter Cambodia Tract or P. 216 F cotton raised as an off-seasonal crop in the rice-fallows; (2) the shorter crop period of MCU. 2 compared to MCU. 1 which results in the saving of one or two irrigations and (3) the Summer Cambodia cotton crop not being manured heavily as in the case of irrigated Winter American.

The net return of Rs. 292.72 per acre for the irrigated Winter Cambodia in Table 1 is the mean of the Tract, comprising the four recognised sub-zones viz., (1) early planted sub-zone of medium fertility; (2) late planted fertile sub-zone; (3) late planted droughty sub-zone represented by Avanashi Tract gives the highest yield (vide Table II) and the seed cotton is also much sought after in trade and goes by the special name *Avanashi Cambodia* and is valued high. In the late planted droughty zone representing the taluks of Palladam and Udamalpet and parts of Gobichettipalayam, Erode and Dharampuram in Coimbatore District and the whole of Salem District, the yield is comparatively low on account of drought and the need for frequent irrigation. Further, the seed cotton from the Salem District known in trade as *Salem Vattagai* lacks strength of fibre and fetches lower price. (4) The crop yield from the Lower Bhavani Project Area is low, on account of the infertile soil; the irrigation charges are the lowest, compared to other sub-zones of the Winter Cambodia Tract, on account of flow irrigation from the Lower Bhavani Project Canal System. It is not uncommon in the early planted sub-zone of Coimbatore District to manure heavily, even upto 80 to 100 cart loads of compost or Farm Yard Manure per acre, to push up the yield. The costs of manures and manuring are, therefore, high here.

Based on the yield and monetary return realised therefrom, the sub-zones of the Irrigated Winter Cambodia Tract may be placed in the order of (1) the late planted fertile sub-zone; (2) the early planted sub-zone of medium fertility; (3) the late planted droughty sub-zone and (4) the Lower Bhavani Project Area. (Vide Table II.) When the soil of the Lower Bhavani Project Area is built up, by growing leguminous crops and ploughing them in and by the application of compost and other organic manures, the yield of the cotton crop there, is bound to rise up.

In the cultivation of P. 216 F cotton, which is raised as a summer crop after the harvest of paddy, as is the case with MCU. 2, the net return is less than that of MCU. 2 crop. The reasons are mainly (1) the early maturing habit of P. 216 F cotton results in comparatively low yields; (2) it fetches a low premium for its lint as compared to MCU. 2; and (3) P. 216 F cotton being a recent introduction in the rice-fallows, the rice-farmers have not acquired the habit of bestowing the care and attention required for the successful cultivation of cotton as their counterparts in the Southern Districts where the cultivation of MCU. 2 cotton after the harvest of paddy has become the main stay in the economics of the Tract. The after

cultivation charges for P. 216 F cotton in rice-fallows are high compared to other Tracts, since the normal practice is to dibble cotton seeds in paddy stubbles without any preparatory cultivation. The stiff clayey soil of rice fields demand a higher seed rate and more labour for hand dibbling. Hence, the expenses on seeds and sowings are higher. The one distinguishing feature in cultivation of cotton in rice-fallows is the availability of cotton residue to augment the supply of green matter to the succeeding paddy crop.

As the unirrigated cottons do not require elaborate preparation and much attention, the cultivation expenses are low. The crop yield and the monetary return are also accordingly low. While plant protection is a common measure in the cultivation of Cambodia cottons, irrigated or rain-grown, it is rare in the case of Karunganni cottons, as they are comparatively free from pests and diseases.

Among the rain-grown cottons the Unirrigated Cambodia gives the highest yield and more monetary return per acre. But, its cultivation has a limitation, as this could be successfully grown only in areas where there is a well distributed annual rainfall of about 40 inches, at least half of which should be received during the period of crop growth. The net monetary return from the Unirrigated Cambodia crop is about that of irrigated P. 216 F cotton in the rice-fallows. The main reasons are (1) the low cultivation charges and (2) the usual practice of leaving the Unirrigated Cambodia crop for the *kar* season or second flush.

Karunganni cotton is eminently suited to the black cotton soil regions of the State. But, of all the cotton growths, the net profit from the Karunganni cotton is the lowest. Though K. 2 and K. 5 show preferences to the Southern Karunganni and Central Karunganni Zones respectively, there is not much difference in the yield potentiality or in the monetary return between the two strains or the regions of growth.

(i) *Irrigated Cambodia*: (Both Winter and Summer): Forming ridges and furrows saves irrigation water and enables the use of labour saving implements, resulting in reduction in cultivation charges. Closer spacing and early sowing contribute towards increased yield. The practice of manuring the crop heavily as is done in certain parts of Coimbatore District produces only rank crop growth without corresponding increase in yield. The manurial dose of 40 lb N, 15 lb P₂O₅, 15 lb K₂O and 5 tons of Farm Yard Manure is

generally found to be sufficient for irrigated cottons. Half the dose of Nitrogen and full dose of P₂O₅ and K₂O may be applied at the last ploughing and the remaining half of nitrogen top dressed at the flowering stage.

Line sown cotton can be inter-cultivated with a bullock-drawn Junior-hoe which is economical than working with mammaties. The installation of electric pump-set will considerably reduce the irrigation charges compared to irrigation by mhotes. The following plant protection measures are recommended for American cotton. Dress seed with Agrosan or Ceresan at the rate of one oz., for 20 lb. of seed, just before sowing. This is necessary to control primary infection by black-arm. Spray with Endrin or Endrex at one ounce in six gallons of water when the crop is a month old. This is for checking jassid and other insects. Spray again with a combination of four ounces of Folidol and one lb of any copper oxychloride fungicide like Cupravit, Shell copper etc., in 40 gallons of water. This is to check boll worm and other insects and also for controlling secondary infection of black-arm. This may be given when the crop is about two months old.

Repeat the combination spray described above when the crop is about three months old. If pests or disease still persist, a fourth round of spray (combination) may be given when the crop is 4 to 4½ months old. Too many sprayings with pesticides induce rank crop growth and cause the shedding of buds and flowers. Judicious plant protection measures are, therefore, necessary to push up the yield. Irrigation given immediately after spraying pesticides is found to enhance the yield.

Kapas yields in the Lower Bhavani Project Area can be increased by improving the tilth and fertility of the soil by growing a leguminous green manure crop with application of phosphate and ploughing it in, growing cotton early in September and adopting close spacing.

Sowing the new strain 9030 G (renamed as MCU. 3 Pongal) in the Irrigated Winter Cambodia Tract is found to give increased lint yield resulting in more monetary return.

(ii) *Unirrigated Cambodia*: Application of Standard Mixture No. 1 at 150 lb per acre at the time of last ploughing, in addition to five tons of Farm Yard Manure or compost increases the yield. The net income can be increased by mixed cropping with coriander, tenai (*Setaria italica*) and/or black gram.

(iii) *Cotton in rice-fallows* : The heavy expenditure involved in the inter-cultural operations may be curtailed by the use of labour saving implements. By training the labourers in the method of cotton picking and by proper guidance and supervision, the picking charges may be reduced. Ensuring efficient germination and good stand, close spacing of the plants at 2' x 6" with two plants per hole and application of 75 lb. Nitrogen per acre in two split doses during the fourth and eighth weeks after sowing have been found to increase the yield of P. 216 F cotton and the net monetary return per acre.

(iv) *Karunganni cottons* : (Both Central and Southern Tracts) : Deep ploughing is not essential. Ploughing twice or thrice according to the condition of the field is sufficient. Thorough preparatory cultivation and inter cultivation are necessary only when the field is infested with weeds.

In areas receiving more than 30 inches of rain, Standard Mixture No. 1 at the rate of 150 lb per acre may be applied at the time of last ploughing, in addition to five tons of Farm Yard Manure.

The recently released strain K. 6 (Pandyan) is found suitable for both the Central and Southern Karunganni Tracts, yielding more revenue.

Mixed cropping yields more revenue to the cultivator than sowing Karunganni cotton as a pure crop. Karunganni cotton lends itself to mixed cropping with a variety of crops like coriander, blackgram, greengram, horsegram, tenai (*Setaria italica*), groundnut, gingelly, castor and indigo. The economics of mixed cropping as compared to pure cropping are furnished below :—

Details of cultivation.	Pure Crop.	Mixed Crop.
A. <i>Cultivation expenses.</i>	Rs.	Rs.
1. Preparatory cultivation	20.00	20.00
2. Manures and Manuring	20.00	20.00
3. Seeds and sowing	5.56	10.18
4. After cultivation	13.00	13.50
5. Irrigation	Nil	Nil
6. Plant protection	Nil	Nil
7. Harvesting	15.00	21.15
Total expenses	73.56	84.83

Details of cultivation.	Pure Crop.	Mixed Crop.
B. <i>Receipts</i> :		
Yield of kapas	333 lb.	255 lb.
Cost of kapas	136.77	104.73
Value of cotton stalks	5.00	4.00
Black gram 41 M. Ms. at 87 N. P. per M. M.	...	36.00
Coriander 35 M. Ms. at 50 N. P. per M. M.	...	17.50
Tenai 22 M. Ms. at 50 N. P. per M. M.	...	11.00
Total receipts	141.77	173.23
Deduct expenses	73.56	84.83
Net profit	68.21	88.40
Therefore, extra profit in mixed cropping	... Rs. 20.19	

For all cottons, whether Cambodia or Karunganni, whether irrigated or rainfed, sowing seeds in lines is advantageous (1) for reduction in seed rate and the cost thereof; (2) for uniform placement of seeds and efficient gap filling; (3) for ensuring uniform stand and increase in crop yield; and (4) for use of labour saving implements and reduction in the cost of cultivation. Picking kapas early in the morning, grading good and bad kapas even at the time of harvest, gathering kapas at frequent intervals, picking kapas only from well burst bolls and drying for a while in shade before storage, improve the grade and quality of kapas and therefore fetches a better price. Instead of selling the kapas in piecemeal as and when harvested, it is advantageous to pool together all the harvested produce and then market it in one lot when the prices are favourable.

Conclusions: Cotton cultivation is of great importance both in the agricultural and industrial economy of the Madras State. It is a cash crop largely prized by the Central and Southern Districts of the State. It is an essential commodity of the textile industry and has largely contributed to the prosperity of the State and the people. The raw cotton produced in the State, meets in part only, the needs of the State. Out of the total quantity of about 8 lakh bales required by the mills in Madras State only 3.6 lakh bales are produced locally. It is, therefore, needless to point out the necessity of increasing the cotton production in Madras State. In any attempt to increase the cotton production, the net return per acre from the aspect of grower should not be lost sight of.

TABLE I.

PARTICULARS	CAMBODIA.				KARUNGANNI.	
	Irrigated Winter Cambodia (M.C.U. I)	Irrigated Summer Cambodia (M.C.U. 2)	Rice fallows (P. 216 F)	Unirrigated Winter Cambodia (M.C.U. 1)	Central Karunganni Zone (K. 5)	Southern Karunganni Zone (K. 2)
A. Cultivation Expenses (Rs.) :						
1. Preparatory cultivation	37.00	25.25	...	18.00	14.62	20.00
2. Manures and Manuring	69.13	46.46	41.00	29.64	22.19	20.00
3. Seeds and sowing	7.28	5.61	12.50	4.98	2.59	5.56
4. After cultivation	37.85	21.57	48.25	14.16	12.22	13.00
5. Irrigation	53.94	42.25	30.00	...	...	...
6. Plant protection	25.63	22.75	22.00	15.00	...	...
7. Harvesting including pulling out stalks	46.94	48.36	42.38	22.75	18.12	15.00
Total expenses	277.77	212.25	196.13	104.53	69.74	73.56
B. Receipts :						
1. (a) Yield of kapas (lb per acre)	1,156	1,060	882	678	329	333
(b) Rate per podhi (280 lb) of kapas (Rs.)	136.00	140.00	120.00	125.00	120.00	115.00
(c) Value of kapas (Rs.)	561.49	530.00	378.00	302.68	141.00	136.77
2. Value of cotton stalks (Rs.)	9.00	8.00	20.00	6.00	5.00	5.00
Total receipts (Rs.)	570.49	538.00	398.00	308.68	146.00	141.77
Less expenses (Rs.)	277.77	212.25	196.13	104.53	69.74	73.56
Net income per acre (Rs.)	292.72	326.75	201.87	204.15	76.26	68.21

Note :— (i) The economics of cultivation for the Irrigated Winter Cambodia is the mean of the four sub-zones recognised in the Tract.
(ii) Under rice-fallows, cotton residue is valued as green manure.

TABLE II.

PARTICULARS	Sub-zones of Irrigated Winter Cambodia Tract				Mean of the Tract	
	Early planted sub-zones	Late planted fertile sub-zone	Late planted droughty sub-zone	Lower Bhavani Project Area		
A. Cultivation Expenses (Rs.):						
1. Preparatory Cultivation	...	25.00	32.50	46.50	44.00	37.00
2. Manures and Manuring	...	107.60	40.00	80.90	48.00	69.13
3. Seeds and Sowing	...	9.10	7.25	6.25	6.50	7.28
4. After Cultivation	...	30.98	45.50	32.50	42.40	37.85
5. Irrigation	...	45.00	60.00	84.00	26.75	53.94
6. Plant Protection	...	30.00	30.50	14.00	28.00	25.63
7. Harvesting including pulling out stalks	...	41.25	56.25	41.50	48.75	46.94
Total Expenses	...	288.93	272.00	305.65	244.40	277.77
B. Receipts:						
(a) Yield of kapas (lb. per acre)	...	1214	1458	1076	876	1156
(b) Rate per podhi (280 lb.) of kapas Rs.	...	140/-	140/-	130/-	135/-	136/-
(c) Value of kapas (Rs.)	...	607.00	729.00	500.00	422.00	561.49
2. Value of Cotton Stalks	...	10.00	10.00	8.00	8.00	9.00
Total Receipts	...	617.00	739.00	508.00	430.00	570.49
Less Expenses	...	288.93	272.00	305.65	244.40	277.77
Net income per acre	...	328.07	467.00	202.35	185.60	292.72

Plant Introduction in Madras State — on the
Preliminary Trials of Fourteen Varieties of Beans
(*Phaseolus vulgaris* Linn.) Received from Hungary

by

D. DANIEL SUNDARARAJ, V. RAMAKRISHNAN and M. NAGARAJAN.

Introduction: Plant introduction as one of the direct methods by which crop improvement can be effected is well recognized. By introducing exotic plants from areas with similar ecological conditions into suitable tracts and acclimatising and exploiting them for extensive cultivation, quicker results are obtained. This aspect of crop improvement came to be recognised by the Government of Madras as early as the latter part of 19th Century and the work was carried out at the Government Botanical Gardens, Ootacamund, Sim's Park, Coonoor, gardens at Kallhatti and the fruit stations at Kallar and Burliar. The results of these Plant Introduction trials on the Nilgiris have been well brought out by Krishnamurthi (1953). All these stations which are situated on the Nilgiris at elevations ranging from 1500 to 7500 ft. enjoy diverse climatic conditions tempered by the altitude and the monsoon rains received during the different seasons of the year. The acclimatisation and extensive cultivation of potato, most of the exotic vegetables, Cinchona, sub-tropical fruits, spices like cloves, nutmeg, all-spice, *Cinnamon* etc., and the nearly hundred species of *Eucalyptus* are the results of such Plant Introductions.

In the year 1947 a scheme for the intensive Plant Introduction and trial was sanctioned by the Government of the then composite Madras State with five Research Stations namely Ootacamund, Wynaad, Siruguppa, Aduthurai and Anakapalli as its venue of work. The scheme ran only for a year and it resulted in successful introduction of *Ochroma lagopus* (Balsa — Aeroplane Wood), *Pelargonium graveolens* (scented Geranium), *Salix babylonica* (Weeping willow) and *Ocimum kilimanjaricum* (Camphor tulsi). Rajasekhara Mudaliar C. (1953).

The Plant Introduction and acclimatisation trials are now being carried out as a routine item of work by the Division of Botany, Agricultural College and Research Institute, Coimbatore in collaboration with the various Crop Specialists and the officers-in-charge of the different Research Stations of the State. So far over 2500 species and varieties have been under trial from introductions

from different parts of the World and within the country for trial as fodders, essential-oil yielding plants, fibre plants, green manuring and green leaf manuring plants, cover crops, soil conservation plants etc. These trials have enabled the successful introduction of *Panicum antidotale* (Australian Drought Resistant Grass from Australia), *Cenchrus glaucus* (Blou buffel) and *Cynodon plectostachyon* (Giant Star grass) from Tropical Africa among grasses and *Calapagonium mucunoides*, *Centrosema pubescens* and *Indigofera teysmanii* among legumes from Ceylon. The special variety of Kapok (*Ceiba pentandra* var. *caribæa*) another noteworthy introduction from Malaya, which is gaining considerable importance because of its precocious and prolific bearing. Many more noteworthy introductions are under extensive trial.

Fourteen varieties of French beans both bushy and runner types were received from the Department of Agriculture, Budapest, Hungary during 1958. These were tried at the Agricultural Research Station, Nanjanad, the Pomological Station, Coonoor, Government Botanical Gardens, Ootacamund and the Millets Breeding Station, Coimbatore with a view to acclimatising and selecting the most suitable ones for growing as vegetables.

Performance of the Varieties Tried: The seeds of the fourteen varieties were sown during the spring of 1958 and 1959 at Ootacamund, Nanjanad and Coonoor; at Coimbatore they were sown during November 1959. The performance of all these varieties tried has been summarised in the tabulated statement:

Results of the Trials:

1. Of the fourteen varieties tried, Balfi (1058) has been found to be the best and has performed well in all the Stations tried, with prolific setting. Pods are soft and less stringy.
2. Soproni lopos (1056), Balfi (1058) and Tetenyi gyongy (1059) were found to do well at lower elevations like Millets Breeding Station, Coimbatore.
3. Wach's superba (1066) was found to give good fruit set only at Ootacamund and hence suitable to the locality.
4. Varieties Soproni lopos (1056), Tetenyi gyongy (1059) are runners while Tetenyi furj bab I tip, (1060), Tetenyi furj bab II tip (1061), and Sure Crop (1065) are twiners. The rest of the varieties are erect in habit.

5. Earliness in flowering and bearing was observed in the varieties Tetenyi furj gyongy (1059), Tetenyi furj bab I tip (1060), Javitott arayenso (1062), Full Crop (1063), Sure Crop (1065) Kidney wax (1067), and Wachs Superba (1066).
6. Poor fruit setting was recorded in Tetenyi cukor (1057), Tetenyi gyongy (1059), Tetenyi furj bab I tip (1060), Tetenyi furj bab II tip (1061), Tender green (1064), Sure crop (1065) and Kidney wax (1067).
7. Varieties Soproni lopus (1056), Tetenyi cukor (1057) and Tetenyi gyongy (1059) were found to be susceptible to diseases like leaf spot and rust.

Acknowledgment: The Curator, Government Botanical Gardens, Ootacamund, the Assistant Horticulturist, Coonoor, the Superintendent, Agricultural Research Station, Nanjanad and Millets and Pulses Specialist, Coimbatore and their staff have taken keen interest in these Plant Introductions and their trial. The authors gratefully acknowledge their contributions.

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TABLE I
Summary Statement of the Performance.

No.	Name of the Variety accession No.	Growth and Growth habit	Flowering	Fruiting	Remarks
1.	Balfi (1058)	Erect and bushy with very vigorous growth	Late (42 days)	Late (70 days) and good	Vigorous growth with prolific fruit setting both in the plains and in the hills. Pods long, soft and less stringy. Cooking quality medium.
2.	Full Crop (1063)	Erect and bushy	Early (30 days)	Early (55 days) and good	Pods yellow and medium long. Cooking quality medium. Performed well in all the hill stations.
3.	Tetenyi Ken Bab (1055)	Erect and bushy	Late (42 days)	Late (70 days) and good	Uniform performance in all the hill stations. Pods long, flat and green. Cooking quality normal
4.	Soproni Lopus (1056)	Runner with vigorous foliage	Late (42 days)	Late (70 days) and moderate	Growth good in all the hill stations. Pods short and fibrous. Cooking quality medium. Susceptible to leaf spot disease at Coonoor and Nanjanad.

Name of the Variety accession No.	Growth and Growth habit	Flowering	Fruiting	Remarks
5. Javitott Arayenso (1062)	Erect and bushy with vigorous growth	Early (30 days)	Early (55 days) and moderate	Pods yellow and medium long. Cooking quality nor- mal. Performed well in all the hill stations.
6. Golden Wax (1068)	Erect with poor growth	Late (42 days)	Late (70 days) and moderate	Pods flat and yellow. Cooking quality medium.
7. Tetenyi Furj Bab II Tip (1061)	Feeble twiner	Late (42 days)	Late (70 days) and poor.	Pods broad with red streaks. Cooking quality medium.
8. Tender Green (1064)	Erect with luxur- ient growth	Late (42 days)	Late (70 days) and poor	Pods medium long, purple streaked. Cooking quality medium. Pod formation was good at Coonoor and very poor in the other hill stations.
9. Wach's Superba (1066)	Erect with slow growth	Early (30 days)	Early (55 days) and poor	Fruit set was good only at Ootacamund. Germination and growth was slow in the other hill stations. Pods plumpy, yellow and cylindric. Cooking quality medium.

Name of the Variety accession No.	Growth and Growth habit	Flowering	Fruiting	Remarks
10. Sure Crop (1065)	Feeble twiner	Early (30 days)	Early (55 days) and poor	Pods yellow, long and fib- rous. Cooking quality med- ium.
11. Tetenyi Furj Bab I Tip (1060)	Twiner with vigo- rous growth	Early (30 days)	Early (55 days) and poor	Pods moderately long, many seeded with purple streaks. Cooking quality inferior. Growth vigorous in all the hill stations. Pod formation poor at Nanja- nad and Ootacamund.
12. Tetenyi Cukor (1057)	Erect and bushy	Late (42 days)	Late (70 days) and very poor	Fruit setting was very poor at Coonoor and completely absent at Ootacamund. Cooking quality normal. Susceptible to rust disease in all the stations.
13. Tetenyi Gyongy (1059)	Runner	Early (28 days)	Early (55 days) and poor.	Pods broad. Cooking qua- lity inferior and a poor bearer in the hill stations. Susceptible to Rust disease in all the stations.
14. Kidney Wax (1067)	Erect with very poor growth	Early (28 days)	Early (55 days) and poor	Pods yellow, plumpy and short. Cooking quality medium. Growth very poor in all hill stations.

Research Notes

Can Green Leaf Substitute Ammonium Sulphate which is in Scarcity?

It is a confirmed fact that organic manures are far more superior to inorganic fertilizers in building up of soil texture and structure and in maintaining soil fertility. However, based on the results of manurial experiments conducted for irrigated paddy crop in research stations, an optimum dose of 5000 lb. of green leaf + 150 lb. of Super Phosphate as basal dressing and 20 to 30 lb. N. in the form of Ammonium Sulphate or any other Nitrogenous fertilizer as top dressing per acre is being recommended by the Department for adoption by cultivators to get higher returns from their lands. Though, of late, the ryots have become fertilizer-minded and are prepared to use nitrogenous fertilizer like Ammonium Sulphate for manuring their crop, they are not able to do so due to shortage in supply of nitrogenous fertilizers especially Ammonium Sulphate. In order to find out whether by increasing the dose of green leaf the use of Ammonium Sulphate can be completely dispensed with, in the case of main *Samba* crop which occupies nearly 10 lakhs of acres in Thanjavur District, an observational trial was laid out during 1959-60 at the Agricultural Research Station, Aduthurai. Strain Co. 25 which occupies the largest area in single crop lands in this district, was grown in this trial. The treatments and grain yields are furnished below:

Treatments:

1. Basal dressing of 5000 lb. green leaf and 150 lb. of Super Phosphate and top dressing of 150 lb. of Ammonium Sulphate per acre.
2. Basal dressing of 7500 lb. of green leaf and 150 lb. of Super Phosphate and top dressing of 75 lb. of Ammonium Sulphate per acre.
3. Basal dressing of 10,000 lb. of green leaf and 150 lb. of Super Phosphate per acre and no top dressing of Ammonium Sulphate.

Yield	Treatments		
	1	2	3
Acre yield of grain in lb.	4316	4333	4333
Percentage on control (Trt-1)	100.0	100.4	100.4

From the grain yields, it is seen that if 10,000 lb. of green leaf is applied, there is no need to apply Ammonium Sulphate to the main *Samba* crop, since the same yield can be obtained from the land without sulphate. Further at this station it is also observed that in the case of

main *Samba* crop if Ammonium Sulphate is top dressed the crop tends to lodge prematurely even before the full emergence of the earheads, whereas in the fields where the crop received 10,000 lb. of green leaf and no Ammonium Sulphate, it does not lodge before completion of flowering. Further when the expenditure on manuring is worked out, it is seen that it comes to Rs. 45.50, Rs. 34.50 and Rs. 23.50 for treatments (1), (2) and (3) respectively. From the economic point of view also, it is found that applying extra dose of green manure and dispensing with Ammonium Sulphate is found to be the cheapest.

Since it is very easy for every ryot in Thanjavur District to grow green manure in the single crop area, it is advisable to apply 10,000 lb. of leaf and dispense with top dressing of Ammonium Sulphate to the main *Samba* crop and utilise the quantity of Ammonium Sulphate thus conserved to the *Thaladi* crop which usually requires quick acting nitrogenous fertilizers to put on good growth and to give higher yield of grain.

The authors' thanks are due to Sri A. Abdul Samad, Paddy Specialist for his valuable suggestions for the conduct of this trial.

Agricultural Research Station, }
Aduthurai.

V. SRINIVASAN AND
A. SUBRAMANIAN.

A Note on the Evolution of Synthetic Variety in Cumbu. (*Pennisetum typhoides*)

Heterosis has been successfully exploited in *Pennisetum typhoides* in Madras State. As a result of research carried out at the Millets Breeding Station, Coimbatore under a scheme jointly financed by the Indian Council of Agricultural Research and the State Government, three high yielding Hybrids are under distribution to the farmers. The chief bottleneck in the rapid spread of the hybrids is the lack of effective seed multiplication organisation for the multiplication and distribution of the hybrid seeds and the necessity of producing the seeds every year. One of the methods to overcome this defect, is to replace the hybrids with equally high yielding synthetics which retain the vigour atleast for three generations. The performance of a synthetic variety produced by combining six inbreds is presented in this paper.

Six high yielding inbreds selfed for more than ten generations were taken for building up a synthetic variety. Two methods were adopted for the production of the synthetic. In one case, seeds of the six parents were mixed in equal proportion and sown. In the second method, seeds of 15 single crosses effected among the six parents were mixed and sown. The resultant bulks obtained by the above two methods, were studied in F. 1, F. 2 and F. 3 generations for assessing the extent of reduction in successive generations. A randomised layout was adopted with the following treatments replicated five times, the size of each plot being 0.16 cents. The crop was grown under rainfed condition with (1) Synthetic produced by mixing and sowing the parents.

(a) F. 1. seed. (b) F. 2. seed. (c) F. 3. seed.

(2) Synthetic produced by mixing the seeds of single crosses among the six parents.

(a) F. 1. seed. (b) F. 2. seed. (c) F. 3. seed. The yield data are as follows:—

Variants	Grain yield in lb. per acre	Grain yield as a percentage of mean of parents
Syn. 1 A F. 1.	650	157.3
Syn. 1 A F. 2.	625	152.3
Syn. 1 A F. 3.	588	142.3
Syn. 1 B F. 1.	588	142.3
Syn. 1 B F. 2.	588	142.3
Syn. 1 B F. 3.	538	129.5
Mean of Parents	413	100.0
Standard error	80.0	19.4
Whether significant or not	No	...

Note: 1 A. Mixture of seeds of single crosses; 1 B. Mixture of seeds of Parents.

It may be seen from the table that the fall in yield from F. 1. to F. 3 is about 13 to 15% which is a distinct advantage over the single cross hybrids which normally show a reduction of 42% to 87% (Annual progress report of hybrid cumbu scheme, 1953-1954.) These studies have also revealed that making single crosses among inbreds and mixing their seeds for building up a synthetic variety does not result in any additional advantage. Hence sowing seeds of inbreds mixed in equal quantity is efficient and effective and can easily be followed for the production of synthetic. Further studies regarding the number of generations to which the synthetics can be grown with advantage are in progress.

Millet Breeding Station,
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ANAVARADHAM, L
SUBRAMANIAM, A.

Ideal Spacing for Cotton Crop in Rice Fallows.

The cultivation of cotton P 216-F in summer months has been introduced in the Cauvery delta in Tiruchirapalli, Tanjavur and South Arcot Districts. In this note the results obtained from nine experiments conducted at Aduthurai, Palur and Coimbatore during 1956, 1957 and 1958 seasons in order to determine the most suitable spacing for this crop are reported.

Twelve different kinds of spacing formulated by combining two kinds of spacing between lines ($1\frac{1}{2}'$ and $2'$) three kinds of spacing between plants ($4\frac{1}{2}"$, $6"$ and $9"$) in the row and two ways of allowing plants in each whole (one plant and two plants per hole) were tried. The average yield of kapas obtained under each spacing is given in the following table:—

Mean Yield of Seed-Cotton in Pound per Acre.

Spacing between lines in feet	Spacing between plants in each row						Mean
	4½"		6"		9"		
	One plant per hole	Two plants per hole	One plant per hole	Two plants per hole	One plant per hole	Two plants per hole	
1½	1029	1053	1075	1027	1011	1067	1044
2	1003	992	1011	1026	943	984	993
Mean	1019		1035		1001		

One plant per hole = 1012

Two plants per hole = 1025

The figures given above show that:

- $1\frac{1}{2}$ feet spacing between lines is always better than 2 feet spacing.
- 6-inch spacing between plants in rows is better than 9-inch spacing; but $4\frac{1}{2}$ -inch spacing is not better than 6-inch spacing.
- The yields tends to be more when two plants are allowed to grow per hole than only one plant is allowed; but such increase may not always be the case.

The maximum yield of 1075 lb. of kapas per acre has been obtained for the kind of planting consisting of $1\frac{1}{2}$ feet between lines, 6 inches between plants and one plant per hole and this method of planting is therefore recommended for adoption. The quantity of seed required for this mode of planting is 20-25 lb. per acre.

K. KANNIYAN.

D. L. 269-A High Yielding Good quality Strain of Garden Bean - *Dolichos lablab* variety *typicus*.

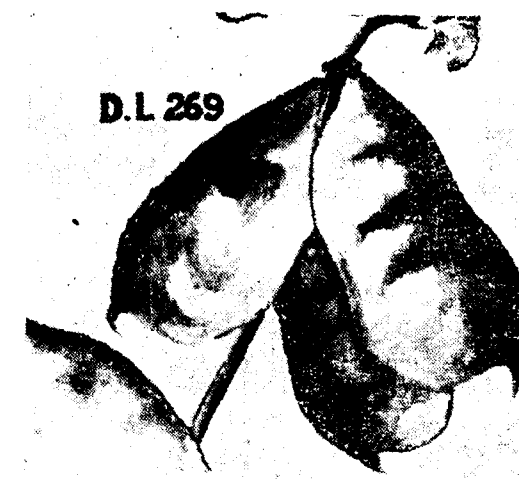
The garden bean *Dolichos lablab* variety *typicus* known as Avarai in Tamil is a popular vegetable in South India cultivated in kitchen gardens. It forms a good source of vegetable protein and calcium. The most important characters associated with good quality in this vegetable are the softness of the pods and its taste. Softness in turn is associated with the fibre content which also influences the texture of the pod to a considerable extent. It has been observed that the soft and fleshy pods show heavy wrinkling after drying due to the dessication of the tender tissues. There is also variation in the range of the taste from the slightly bitter to the sweet taste, the light green pods being sweeter than those having dark green pigmentation. For evolving an improved strain in Avarai for vegetables, selection has therefore to be made for high yielding types with a lower proportion seed to pod and which wrinkle heavily on drying.

As a result of studies made on the collections of South Indian varieties in respect of the characters mentioned above, eight economic types were selected as the best in quality. The eight types were grown and studied for their yield performance during 1958-59 with a view to fix the best for distribution among cultivators. The comparative merits of the types studied and the yields obtained were as follows:—

Type number	Colour of pods	Pod size Length and Breadth in cm.	Wt. of 100 pods at picking time in ounces	Wt. of 100 pods when dried in ounces	Extent of wrinkling of pods on drying	Percentage of pod to seed	Total yield of pods per cent in lb.
D. L. 244	Light green	7.0×2.2	8.9	5.9	Light	75.0%	22.8
D. L. 250	Light green	8.9×1.8	23.0	7.3	Heavy	81.3%	32.1
D. L. 259	Light green	9.4×3.7	21.0	5.5	Heavy	69.0%	37.4
D. L. 269	Light green	11.7×5.0	28.0	7.7	Heavy	62.5%	67.4
D. L. 279	Green with purple edge	11.1×1.9	6.0	2.9	Light	75.0%	22.5
D. L. 389	Purple	11.5×2.3	20.5	6.7	Heavy	75.0%	34.0
D. L. 453	Purple	10.4×3.4	18.3	6.4	Heavy	69.0%	24.7
D. L. 692	Light green	14.4×1.4	14.0	5.5	Medium	75.0%	34.8

It may be seen from the data presented above that the maximum yield of 67.4 lb. of pods per cent was recorded in the case of D. L. 269. This economic type is not only a high yielder but also has a large sized pod. It is because of the big size and shape of the pod the variety is

popularly known as "Elephant ear" (Yanai Kathir Avarai), (see illustration). It is highly fleshy as is indicated by the heavy wrinkling on drying. Being light green in colour the pods are sweet to taste.



They are also suited for preservation after boiling with salt and drying. The pods thus processed are tasty when fried in oil or ghee. This quality combined with high yield make D. L. 269 the best among the economic collections studied at the Millets Breeding Station, Coimbatore.

Millets Breeding Station,
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SUBRAMANIAM, A.
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Overlapping of male and female phases in *Areca cathecu* Linn.,* and the role of Thrips spp. as pollinating agents

Arecanut (*Areca cathecu* L.) is a monoecious palm producing male and female flowers in the same spadix. Rarely bisexual flowers are also seen in the same spadix (Raghavan and Murthy, 1954 and Adyanthaya and Bhat, 1955). Probably the earliest description of the floral characters of the *areca* is by Sands (1926). He recognizes the existence of male and female flowers only and does not mention the presence of bisexual flowers. He mentions that the male phase begins immediately after the spadix frees itself of the spathe. This phase lasts for three to four weeks. After

* According to Bailey (1951), the name is commonly misspelled as *catchu* but it was not so written by Linnaeus, author of the name in the three editions of *Species Plantarum*.

the last male flowers have opened, the petals of female flowers open slightly at the tips and soon after become receptive. Sands is definite that the female phase starts after the close of the male phase; in some instances, the flowers open a day following the close of the male phase while in others upto eleven days elapse before they open. He estimated the average time between the two phases as four days. He has also noted that the male flowers are visited by various bees and other insects "which appear to collect and feed on pollen only" but no insect visitors are reported on female flowers. He is of the opinion that the pollen is carried by wind and that the flowers are normally cross-pollinated and only under exceptional circumstances can self-pollination take place. He, however, adds that under good conditions, when young trees grow rapidly spadices are produced in such quick succession that the male phase of the last opened spadix may overlap the female phase of the one immediately below so that self-pollination is possible. Raghavan and Baruah (1958) working in Assam have recorded that male and female flowers never open simultaneously. Insects have been found to visit the male flowers regularly but not the female flowers. They consider the role of insects in pollination of *areca* flowers as doubtful. Recently, Murthy and Bavappa (1960) have reported that there was overlapping of the male and female phases in two palms for a period of two days. They also state that self-pollination can give only 0.8 per cent fruit set.



Observations by the authors on fifty trees at the Agricultural College and Research Institute, Coimbatore and at the Fruit Research Station, Kallar in February, 1960 showed that besides the normal case of the female phase commencing one or more days after the cessation of the male phase, two other categories were noticed. In one of these, the male phase occurred either in the same spadix or in the succeeding spadix or

both throughout the period of the female phase which extended over 5.3 days on the average. In the other, the overlapping of male and female phases was partial, wherein the two phases occurred simultaneously only for a limited period. The overlapping of sexes noted in this investigation has not been an accidental or sporadic case but has been proved beyond any doubt in as many as 40 out of the 50 spadices under observation.

It was also interesting to note that contrary to the observations of earlier workers (Sands, 1926; Raghavan and Baruah, 1958) the female flowers in all the plantations in the present study were visited by two species of Thrips, *Rhipiphorothrips cruentatus* Hood and *Thrips florum* Schmutz. It was also clear that these insects not only visited the flowers but also served as good carriers of pollen (vide plate I). Another noteworthy feature in this study is the presence of insects such as ants not only in the male flowers, as reported by Sands and others, but also in the vicinity of the female flowers, which according to them do not harbour any insects. However, only very minute insects like thrips seem to be able to enter the flower. The spiny or bristled bodies of the thrips would appear to be adopted for carrying pollen. This is rendered easier by the reticulated structure of the pollen. The role of thrips as one of the pollinating insects has been reported by Billes (1941) in Cacao, Webber and Bachelor (1948) in citrus and Bohart (1952) carrots.

Acknowledgment: The authors wish to express their thanks to Prof. T. N. Ananthakrishnan, Zoology Department, Loyola College, Madras, for his help in identifying the thrips species.

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Occurrence of Syncotylous Seedling in Ricinus

In a culture of seedlings of castor variety *Cimmaron* raised for study in the green house flats, a solitary seedling showed the presence of a single cotyledon instead of the normal two. No trace of a second cotyledon could be detected in the specimen. The plant had a short stature and the cotyledon and its stalk were nearly double in size than that of the normally developing specimen of the same age. The monocotylous structure assumed a lateral position opposed to the first formed leaf. It is also interesting to record the development of a single leaf instead of the normal two from the cotyledonary node.

Syncotyly has been explained by De Vries (1911), Sargent (1903) and Aiyadurai and Nagarajan (1958) to denote the fusion of two cotyledons in the dicotyledonous genera of plants to form a single structure. Aiyadurai and Nagarajan (1958) have shown that the cotyledonary stalk of the syncotylous *Arachis* seedling possessed double the number of vascular bundles than the normal. A similar anatomical study was undertaken in *Ricinus*. In the normal case the cotyledonary stalk possessed nine collateral vascular bundles arranged in a radial fashion. In the case of the syncotylous seedling the number of vascular bundles was not exactly double than found in the normal, as only eleven collateral vascular bundles were found. However the vascular bundles were nearly double in size than the normal.

Although cases of syncotyly have been reported in oilseed crops like *Arachis* (Aiyadurai and Nagarajan) and *Sesamum* (Ghosh) the same does not seem to have been reported so far in the genus *Ricinus*.

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AGRICULTURAL JOTTINGS FOR MAY, 1961.

The month of May is beautifully associated with the sweet fragrance of the May blossoms, mango fruits and the mango showers. Everywhere we come across the colourful sight of the luscious mangoes, one of the most important fruits of South India. In May, the summer showers get intensified with accompanying thunder and lightning and the farmers look forward to the signals of the south west monsoon to break in June. This is a month when everybody will be actively engaged in intensive preparatory cultivation operations to keep the fields ready to be sown with the onset of the monsoon rains. In some places, nurseries are started for the early paddy crops.

Preserve your Cattle Manure :

A good tilth apart from ploughing can result only when there is a plentiful supply of organic matter in the soil. Apart from supplying plant foods, cattle manure prevents the fixation of phosphatic fertilisers in the soil and helps in improving the availability of other plant nutrients. Cattle manure also helps to maintain a good physical condition of the soil promoting aeration and drainage, two essentials for good crop production.

It is therefore essential to collect and preserve the cattle manure properly, by digging a manure pit now itself before the monsoon sets in. When carted and spread in the field, cattle manure should be immediately ploughed in and incorporated, else valuable plant nutrients are lost by exposure to wind and rain. Remember that cattle manure is the foundation of all good agriculture.

Apply Phosphatic Fertilisers :

Essentially, crops require three major nutrients, nitrogen, phosphorus and potassium to produce good yields. There is a tendency to apply ammonium sulphate only which supplies nitrogen alone because a better response is obtained with ammonium sulphate than with others.

It is necessary to apply super phosphate also to all crops because balanced nutrition is a good farming practise. Ammonium Sulphate results in higher yield which in turn leads to a greater utilisation of phosphorus and potassium from the soil. A continuous application of ammonium sulphate thus will lead to a created shortage of phosphorus and potassium and crop yields are likely to go down. Indeed subsequent applications of ammonium sulphate even in small doses sometimes result in rank vegetative growth and lodging.

Phosphorus is essential in promoting root development and for good grain production. Superphosphate is the popular phosphatic fertiliser. Apply it to your fields for bigger crops yields. In some cases, it would be necessary to apply potassic fertilisers. This can be decided from a soil test.

Test Your Soils Free :

While discussing about the fertiliser programme for good crop yields, it will be a good thing if the soil in your farm is tested. The Madras Agricultural Department is maintaining two soil testing stations at Coimbatore and Aduthurai, where soils are analysed free of charge and fertilizer recommendations given. What you have to do is to take a proper sample of your soil and send it. Contact the nearest Agricultural Extension Officer who will help you to collect and send the sample to one of these stations for test. The soil scientist will analyse the soil and give you an idea of its fertility status and advise you what fertilisers you should apply to increase the crop yields.

This is a free service and it is profitable for you to get the soil tested before you decide the fertilisers to be applied. It is now the proper time to test your soils.

Use Improved Seeds of Paddy :

Several improved paddy strains have been evolved by the Madras Agricultural Department which are noted for their high yields, resistance to diseases, non-lodging characters, drought resistance and for many other desirable qualities.

For the early Kar, Kuruvai and Swarnavari season there are excellent short duration strains like Co. 13, TKM. 6, ADT. 3 and 20 and ASD. 1. All these strains have a duration ranging between 90 and 120 days. Of these T.K.M. 6 is an extraordinary good strain, recently introduced, adaptable to a variety of conditions. The quality of the rice is very good quite similar to GEB 24 and merchants pay well for the paddy. ADT. 3 and 20 are very good strains for Thanjavur district, the latter combining earliness with fineness.

A new comer among improved strains suitable for this season is Co. 29, which has a short duration of 110 days. This is a good performer compared to some of the others grown in the same season. It is a hybrid combining high production, earliness and blast resistance. It has been noted that it is suitable for even late planting. Contact your nearest Extension Officer for further information on these useful strains. Grow only improved strains.

Brine-Treat Your Paddy Seeds :

In this treatment paddy seeds are immersed in salt water. Denser seeds perform better than ordinary seeds and the brine treatment is based on this principle. Salt water or brine has a higher density than ordinary water and when paddy seeds are put into salt water, the heavier seeds go down and are separated and used for sowing.

The salt water is made by dissolving half a madras measure of salt in a gallon of water and the paddy seeds are put into this solution. Those that float are removed away and those that settle in the bottom are used for sowing. The brine treated seeds should be washed well and dried in the shade and later treated with Agrosan or Ceresan.

Pretreat Your Paddy Seeds :

It is very well known that prevention is better than cure. This rule can be wisely applied in growing paddy and many diseases like the brown leaf spot disease (*Helminthosporium*) and foot rot which cause extensive damage to crops can be prevented. Research has shown that these diseases spread through the seeds by the spores adhering to the surface of the seeds.

These spores can be destroyed by pretreating the seed with deadly organo-mercuric chemicals sold under the name of Agrosan G N or Ceresan.

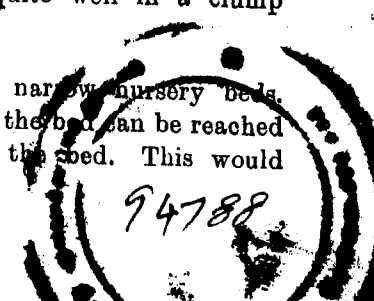
Very small quantities of the chemical are only required and usually 1 oz. of Ceresan or Agrosan is enough to treat 30 lb. of seed. The chemical should be made to spread uniformly on the seeds and this is achieved by putting the seeds and the chemical in a drum and rotating. Where a rotating seed dressing drum is not available, the seeds and the chemical can be put into a mud pot with a narrow neck and rotated till the chemical uniformly spreads on the seeds. Care should be taken not to use the mud pot for any other purpose as the chemical would be adhering to the sides and it is very poisonous. The seeds are now fit for sowing.

Note :— The materials Agrosan and Ceresan recommended here for treating paddy seed should be considered poisonous to man and animals. Care should be taken in handling and using them.

How to Prepare a Good Paddy Nursery :

While preparing your paddy nurseries, it would be a good thing if you follow the golden rule to sow the seeds thin. Generally a madras measure of paddy seeds can be sown in one cent of nursery area. Thin sowing is a good practice in that it gives enough room for every seedling to develop well and in the end we get stout and healthy seedlings. Healthy and stout seedlings establish well when transplanted in the main field and two or three seedlings would do quite well in a clump instead of four to eight usually planted.

Another good rule will be to have long and narrow nursery beds. The width can be four feet so that the middle of the bed can be reached with the hands while sitting on either side of the bed. This would facilitate weeding operations, plant protection etc.



Young paddy seedlings in the nursery are susceptible to pests and diseases. A good mixed spray of a copper fungicide and a parathion compound would go a long way to keep your seedlings healthy. Your Extension Officer will be able to help you on this.

Grade Your Mango Fruits :

May is the month of heavy mango harvest. Farmers are accustomed to sell their mango fruits in the market in one mixed lot to the merchants. Grading of the fruits under 'Agmark' standards would fetch you a better price. Grading is the process of separating fruits or other farm produce into different groups or grades based on their quality. Good grades fetch good prices. Mixing good and bad grades fetches only very poor prices. The Agricultural Produce Grading and Marking Act provides specifications for the grading of mangoes under different grades. When the mangoes are graded and sold, you are sure to get a better price than when you sell the good and the bad ones all together. Therefore grade your mangoes before selling. The State Marketing Officer, Madras-2 would be able to give you all advice and assistance for this new project. It pays to grade before selling.

Look for the Groundnut Red Hairy Caterpillars :

It is good to look a second round for the caterpillars that have escaped your attention in the groundnut crop last month. Some of the small caterpillars that have escaped from the BHC dust would have grown now into bigger caterpillars. Further dusting with BHC will not kill them because the thick red hairs prevent the chemical from acting on the caterpillars. It would be a good thing to spray a Parathion compound because when the caterpillars are well grown they could be killed only by spraying with a strong poison.

Look for the Sorghum Earhead Bug :

Your summer sorghum crop would probably be in flowers during this month and a very damaging pest is likely to appear that affects the earheads, called *Calacoris* or earhead bug. These bugs suck the juice from the sorghum grains and the grains do not grow well and the yields are very much reduced. Unless, timely action is taken to control this bug the yields are likely to be very much reduced. Dusting with BHC 10% will control the pest easily and about 25 lb. of BHC would be enough to dust over an acre. BHC dusting powder is very cheap and is available from your nearest Extension Officer. The dusting operation is also easy when you use a duster. If you do not have a duster, the powder can be put in a thin cloth bag and tied to the end of a pole and dusted on the top of the earheads.

(From the Extension Specialist, Agricultural College and Research Institute, Coimbatore-3).

College and Estate News

Grape Show: The Madras State Grape Society organised the First State Grape Show at the Agricultural College and Research Institute, Coimbatore on the 8th and 9th of April. It was an impressive and colourful show in which over 150 entries including more than a dozen varieties of grapes were on display. As many as 44 private growers of grapes had sent their fruits. There was also an aesthetic display of the varietal wealth of grapes of this State by the Horticultural Section.

The distribution of prizes to the entries adjudged as the best in the several classes was made on the 9th April by Smt. Savithri Shanmugam, M.L.A. Dr. S. Krishnamurthi, President of the Madras State Grape Society spoke on the occasion.

Farewell to Sri T. Nataraj and Sri S. E. Anantharaman: The members of the staff and the students of the Agricultural College gave a farewell party to Sri T. Nataraj, Agronomist and Associate Professor of Agronomy on his promotion as Joint Director of Agriculture and to Sri S. E. Anantharaman, Associate Professor of Agricultural Engineering on his transfer to Madras.

Visit of Dr. Osler: Dr. Osler of the Rockefeller Foundation addressed the members of the Academy of Agricultural Science on 5th April.

Award of Ph. D., and M. Sc., degrees: Sri S. Varadarajan, Lecturer in Chemistry and Sri V. Durairaj, Assistant in Millets have been awarded the M. Sc., and the Ph. D., degree of the Madras University respectively for their thesis entitled "Enzymatic studies on the Diastase of *Aspergillus oryzae*" and "Studies on the fruit rot of Chillies". Our Congratulations to them.

Letter to the Editor

Sir,

I wish to bring the following error in the article "Importance of periodic renewal of improved Cotton seed" by Sri L. Neelakantan, published in your issue of January, 1961. The names of districts recommended for the growth of the cotton variety MCU 1 on page 19 is incorrect; the more important districts of Coimbatore and Salem have been omitted. The names of the same districts recommended for MCU 2 are found against MCU 1 also.

Agricultural College and
Research Institute,
Coimbatore-3.

C. K. RAMACHANDRAN,
Cotton Specialist.

Weather Review — for March, 1961.

RAINFALL DATA (IN INCHES)

Region	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam) ...	...	— 0.3	2.2
	Tirurkuppam* ...	...	— 0.2	1.0
	Vellore ...	...	— 0.3	0.3
	Gudiyatham* ...	...	...	0.5
East Coast	Palur* ...	...	— 0.4	8.1
	Tindivanam* ...	...	— 0.5	5.3
	Cuddalore ...	...	— 0.7	9.5
	Nagapattinam ...	...	— 0.8	0.1
	Aduthurai* ...	...	— 0.3	7.8
	Pattukkottai* ...	...	— 0.5	6.5
Central	Salem ...	...	— 0.5	2.4
	Coimbatore (A. M. O.) * ...	Tr	— 0.8	1.8
	Coimbatore ...	...	— 0.5	2.5
	Tiruchirapalli ...	...	— 0.4	2.2
South	Madurai ...	0.4	— 0.3	2.7
	Pamban ...	...	— 0.7	0.3
	Koilkatti* ...	0.1	— 1.0	8.7
	Palayamcottai ...	0.4	— 0.7	6.9
	Ambasamudram* ...	0.7	— 2.1	11.4
	Nagercoil* ...	0.7	— 0.4	4.5
	Capecomorin* ...	2.8	+ 2.2	8.1
Hills	Kodaikanal ...	0.1	— 1.7	6.2
	Coonoor* ...	0.2	— 4.7	10.1
	Ootacamund* ...	0.2	— 0.9	2.8
	Nanjanad* ...	0.3	— 0.5	2.5

1. * Meteorological Stations of the Madras Agricultural Department.

For three days from 28-3-'61 to 30-3-'61 scattered thundershowers were received in Madras State. Again on 31-3-'61 the weather remained mainly dry except for isolated light rainfall at Palayamkottai. The Government Botanic Gardens, Ootacamund reported the occurrence of a hailstorm on 28-3-'61. But the rainfall received on this day was only 0.20".

Zonal Rainfalls (in inches)

Name of the Zone	Rainfall for March 1961 (inches)	Departure from normal	Remarks
North	...	— 0.4	Far below normal
East Coast	...	— 0.6	"
Central	...	— 0.4	"
South	0.7"	— 0.4	Below normal
Hills	0.2"	— 0.1	"

Agricultural Meteorology Section,
Lawley Road Post, Coimbatore-3.
Dated: 12-4-1961.

C. B. M. & K. P. N.

Departmental Notifications

Gazetted Officers—Madras Agricultural Department Postings and Transfers during the month of April, 1961

Name and Designation	Posted or Transferred to
Sri F. L. Daniel, Assistant Agricultural Chemist, Coimbatore	Agricultural Chemist and Associate Professor, Coimbatore.
" T. N. Ananthanarayanan, Assistant Chemist and Associate Professor of Soil Science, Coimbatore	Reverted to the Cinchona department
" C. Ekambaram, Cane Development Officer, Trichy	Sugarcane Specialist, Cuddalore
" C. K. Appaji, Sugarcane Specialist Cuddalore	Earned leave for 2 months
Kumari S. Malathi Devi, Assistant in Chemistry, Coimbatore	Assistant Agricultural Chemist Saline and Alkaline Lands Reclamation Scheme, Coimbatore
Srimati A. Leela Devid, Assistant Entomologist, Coimbatore	Assistant Entomologist (Vegetable scheme) Coimbatore.
Sri S. Venugopal, Assistant Entomologist, (Vegetable Scheme) Coimbatore	Crop and Plant Protection Officer, (Entomology) Coimbatore
Dr. S. Kanakaraj David, Crop and Plant Protection Officer (Entomology)	Assistant Entomologist (Toxicology scheme) Coimbatore
Sri T. S. Muthukrishnan, Assistant Entomologist (Toxicology scheme) Coimbatore	Assistant Entomologist (Sugarcane Insect Pest Scheme) Cuddalore
" V. Ramalingam, Agricultural Information Officer, Madras.	District Agricultural Officer, Vellore
" S. Muthuswamy, District Agricultural Officer, Vellore	Earned leave for 22 days.
" J. Vaidyanathan on leave	Assistant Agronomist, Sirugamani
" K. R. Sundaresan, Assistant Agronomist, Sirugamani	Cane Development Officer, Trichy
" K. Kannian	Assistant Cotton Extension Officer, Coimbatore.
Kumari P. S. Chandramathi, Assistant Cotton Extension Officer, Coimbatore	Reverted to the Madras Agricultural Subordinate Service and granted earned leave for 30 days.
Sri K. Natarajan, Agricultural Engineer, Madras	General Superintendent, Industrial Engineering Workshop, Madras.
" T. S. Palanivelu, General Superintendent Industrial Engineering Workshop, Madras	Professor of Agricultural Engineering, Coimbatore
" S. E. Anantharaman, Professor of Agricultural Engineering Coimbatore	Agricultural Engineer, Madras
" U. V. Thyagaram, Upper Subordinate	Promoted as District Agricultural Officer, Coimbatore

Upper Subordinates—Agricultural Department
Postings and Transfers during the month of April, 1961.

Name and Designation	Transfer and Postings
Sri K. P. Srinivasan, Analytical Assistant, Soil Testing Laboratory, Aduthurai.	Resigned.
„ K. Pandurangan, Agl. Demonstrator, Cuddalore.	Allotted to Madurai Division.
„ T. A. Palaniappan, Oilseed Assistant, (Zonal nucleus Scheme), Srivilliputhur.	Research Assistant, (Safflower and Niger Scheme) Hosur Centre, Salem Dist.
„ C. V. Thomas	Oilseeds Assistant (Zonal Nucleus Scheme) Srivilliputhur.
„ K. M. Padmanabha Nambisan, Fruit Research Station, Periakulam.	Horticultural Assistant, Apple Research Scheme, Kodaikanal.
„ T. M. Borian, Extension Officer, (Ag.), Papanasam.	Extension Officer, Mulanur.
„ V. R. Raghunatha Rao, Extension Officer, (Ag.) Mulanur.	„ „ Papanasam.
„ P. P. George, Soil Conservation Assistant, Coonoor.	Plant protection Assistant (Mycology) Ooty.
„ K. Sivadasan	Special Agricultural Demonstrator, Mannargudi.
„ P. Samban	Special Agricultural Demonstrator, (Nursery), Vellore.
„ G. Bonadictus	Extension Officer, (Ag.) Thiravasiyaru.
„ C. T. Natarajan, Extension Officer, (Ag.), Kodavasal (on leave)	Assistant Lecturer in Agronomy (Agriculture Section), Coimbatore.
„ S. Ramachandran	Agricultural Demonstrator, Thirumarugal
„ A. Muhammed Sultan Moideen, Agricultural Demonstrator, Madras.	Extension Officer for Agriculture, Acharapakkam.
„ N. Thyagarajan	Agricultural Demonstrator, Kalavai.
„ V. Gopalakrishna Nair	Paddy Assistant, Peravurni.
„ S. Ramakrishnan, Block Development Officer, Dharapuram.	Instructor in Agriculture, Rural Extension Training Centre, Bhavanisagar.
„ T. Unnikannan, (Ag.) Demonstrator, Trichy.	Assistant in Mycology, Coimbatore.

State Prize in the Sugarcane Crop Yield
Competition of 1959—'60

Sri T. S. Ramanurthy Reddiar, Villupuram Taluk, South Arcot District is the State Prize Winner in the Sugarcane crop yield competition for 1959—'60 with an acre yield of 152 tons and 1862 lb. Our congratulations to him.

DISTRICTS
 SOUTH ARCOT, NORTH ARCOT
 COIMBATORE
 RAMANATHAPURAM
 TIRUNELVELI

CROPS
 GROUNDNUT, GINGELLY
 COTTON
 &
 TOBACCO



Review of market Conditions of commercial crops in the notified areas in the Madras State for the month of March 1961.

Cotton :

COIMBATORE DISTRICT : *Season :* The weather was hot, dry and sultry during the month. Some rains were received at Tiruppur, Avanashi, Coimbatore and Pollachi taluks. The standing crop of Karunganni was reported to be fair.

Kapas : The kapas market opened with a stock of 5937 quintals of cambodia and 4 quintals of Karunganni kapas in Tiruppur during the month. The total arrivals into Tiruppur during March were 61376 quintals of cambodia and 504 quintals of Karunganni kapas. The despatches during the month were 43697 quintals of cambodia and 442 quintals of karunganni kapas, being a stock of 23616 quintals of cambodia and 66 quintals of karunganni kapas at the end of the month.

Lint : The lint market had an opening balance of 13801 quintals of cambodia in Tiruppur market. The total arrivals during the month were 19466 quintals of cambodia lint which included 7703 quintals of cambodia lint locally ginned. Despatches from Tiruppur were 15763 quintals of cambodia lint, being a balance of 17504 quintals of cambodia lint at the end of the month.

The prices of kapas and lint that prevailed during the month were as follows :

Centre	Prices in Rs. per quintal.			
	Cambodia Kapas	Lint	Karunganni Kapas	Lint
Pollachi	125.71	356.00	119.29	...
Tiruppur	140.08	...	119.00	...
Sulur	140.00	335.00	...	...
Coimbatore	150.00	350.00	...	...
Avanashi	140.00	335.00	...	...
Erode	139.36	276.00	...	...
Gobi and Bhavani	132.00	276.00	...	...

RAMANATHAPURAM DISTRICT: *Season:* There was no rainfall during the month. Dry weather prevailed during the month under report.

The following were the arrivals and disposals of cotton kapas and lint during the month in Ramanathapuram District:

Kapas: (Kapas in Quintals)

Name of Market	Opening Stock	Receipts	Disposals	Closing Stock
Virudhunagar	...	30859	27224	3635
Sattur	...	4812	3819	1000
Rajapalayam	...	12660	12660	...
Total	...	48338	43703	4635

Lint:

Name of Market	Opening Stock	Receipts	Disposals	Closing Stock
Virudhunagar	248	4443	4158	533
Sattur	177	959	1030	106
Rajapalayam	1422	3554	4976	...
Total	1847	8956	10164	639

Price: (Prices in Rs. per quintal)

Kapas:

Karunganni	88.00 to 112.00
Tinny	86.00 to 89.00
Karunganni	254.00 to 276.00

TIRUNELVELLI DISTRICT: *Season:* There was no rain during the month under report.

The following were the arrivals and disposals of cotton in Koilpatti and Sankarankoil markets during March, 1961.

Lint: (per candy of 355 kilograms)

Market	Crop	Opening Balance	Arrivals	Disposals	Closing Balance
Koilpatti	Karunganni	700	180	640	240
do.	Uganda	Nil	Nil	Nil	Nil
Sankarankoil	do.	310	Nil	240	70
Total		1010	180	880	310

Kapas: (pothi of 127 kilograms)

Koilpatti	Karunganni	50	300	200	150
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Prices: *Kapas:* (per pothi of 127 kilograms)

Karunganni I Sort	Rs. 115.00
Karunganni II Sort	„ 100.00
Uganda	„ 140.00

Season: There was no rain during the month and the weather was dry. The condition of standing irrigated crops was satisfactory. There were no transaction in cotton kapas.

Groundnut:

SOUTH ARCOT DISTRICT: *Groundnut Kernals:* Arrivals were small as the marketing season for summer crop has not commenced. Arrivals from local produce amounted to 1071 tons and receipts from North Arcot, Trichy and Madurai District came to 1104 tons. The oil Mills and country chekkus consumed 2037 tons and 314 tons, respectively. Despatches to Madras, Salem, Chingleput and Tanjore districts amounted to 431 tons. Export to Pondicherry State totalled 75 tons, wastages were calculated at 82 tons. The trade had a stock of 1929 tons at the end of the month. Prices were on the upwards trend and the average prices in the several markets ranged from Rs. 69/- per bag of 80 kilograms.

RAMANATHAPURAM DISTRICT:

Name of Market	Opening Stock	Arrivals	Sales	Closing Stock
Groundnut pods (In quintals)				
Virudhunagar	...	3048	7112	10260
Groundnut Kernel (In quintals)				
Virudhunagar	...	10800	7920	12240
				6480

Prices:

March, 1961

Rs./nP.

Groundnut pods bag of 37 kgs.	24.00— 25.00
Groundnut kernels in 80 kgs.	76.00— 83.33
Groundnut oil in 226.80 kgs.	453.43— 478.67
Groundnut oil-cake in 226.80 kgs.	73.20— 31.33

NORTH ARCOT DISTRICT: No rain was received in the district during the month under report and hot weather prevailed during the month. Harvest of summer groundnut crop commented at the end of the month in Tiruvannamalai and Arkonam Taluks.

The arrivals, disposals and stocks etc., of groundnut in the districts during the month were as follows :

Name of Market	Opening Stock	Arrivals	Disposals	Closing Stock
Groundnut pods (bags of 40 kgs)	22065	5660	10754	16970
Groundnut kernels (bags of 80 kgs.)	2841	22816	21766	8889

Prices :

	Prices in Rs./nP.
Groundnut pods (per bag 40 kilograms)	17-00 to 28-25
Groundnut kernels (per candy of 240 kgs.)	225-00 to 256-00
Groundnut oil (per candy of 226 kilograms)	445-00 to 484-00

TIRUCHIRAPALLI DISTRICT: The district received practically no rains and only hot weather conditions prevailed during the month under review. The standing crop summer groundnut was reported to be good.

The regulated market Jayankondan received 2035 bags of 50 kilograms each and Ariyalur 350 bags of 45 kilograms of groundnut. The increase in the arrivals to the regulated market, Ariyalur was maintained during this month also. This market has been slowly picking up. The other two markets were inactive as usual.

The price of groundnut kernels ranged between Rs. 220/- to 245/- per candy of 240-85 kilograms.

Gingelly :

SOUTH ARCOT DISTRICT: (bag of 80 kilograms): Arrivals improved at Vridhachalam market. The total arrivals came to 2125 bags of 80 kilograms comprising of 1215 bags from district production and 910 bags from Tiruchirapalli district. A quantity of 334 bags was crushed in country chekkus and 1355 bags were despatched to Madras, Salem and Thanjavur districts. A stock of 464 bags was left with the trade at the close of the month.

The average price per bag of 80 kilograms varied from Rs. 100/- to 110-77 in the various markets.

Tobacco :

COIMBATORE DISTRICT: At the end of the month under report, there was a stock of 24856 quintals of chewing and 1780 quintals of cheroot tobacco. About 7179 quintals of chewing and 2075 quintals of cheroot tobacco were exported to places in Kerala, and Mysore States and to Salem, Tanjore and Tiruchirapalli districts of Madras State.

Purchase of new crop tobacco is being effected by trade.

The prices of Meenampalayam tobacco ruled up to Rs. 235/- per quintal. The prices of the cheroot variety ruled upto Rs. 220/- per quintal.

Prices :

Variety	Ist Grade	IIrd Grade	IIIrd Grade
	(per quintal)		
	Rs./nP.	Rs./nP.	Rs./nP.
1. Chewing tobacco-sun cured :			
(a) Meenampalayam	176—231	120—187	88—143
(b) Other varieties	132—225	110—185	88—110
2. Cheroot varieties-sun cured :			
Grown in Erode and Rhavani taluk	154—220	132—176	44—92-40
3. Chewing tobacco-pit cured :			
Grown in Palladam and Sulur areas	150—206		

Cardamom :

MADURAI DISTRICT: During the month under report there was no rain-fall in the plantation areas except in the last week. The standing crop was reported to be fair. Arrivals were reported to be fair in the assembling markets at Madurai and Virudhunagar in Ramanathapuram District.

(Prices in Rs. per lb. (0-450 grams))

Superior bulk	Rs. 9-00 to 9-41
Medium bulk	„ 7-00 to 9-00
Inferior bulk	„ 6-61 to 7-92
Smalls	„ 6-44 to 7-92
Lights	„ 4-71 to 7-77
Splits	„ 8-40 to 9-51

Administrative activities of Market Committees

The Market Committees of South Arcot, North Arcot, Coimbatore, Tiruchinapalli, Tirunelveli and Ramanathapuram were functioning briskly during the month under report.

The first meeting of the Ramanathapuram Market Committee was held on 6—3—1961 at Virudhunagar. Resolution for the acquisition of a site at Rajapalayam for establishing a regulated market was passed. Government requested to grant an interest free loan of Rs. 1,00,000/-. By another resolution the committee has requested the Government to exempt it from audit fees for further three years in view of its poor financial resources.

The meeting of the North Arcot Market Committee, Vellore was convened by the District Revenue Officer, Vellore on 27—3—1961 and Messrs. B. Nagabushanam Naidu of Arkonam and T. S. Vadrachalam Pillai of Tiruvannamalai were declared elected as Chairman and Vice-Chairman respectively.

A meeting of the South Arcot Market Committee was held on 25—3—1961. The administration report of the Committee for 1960 was approved. The appointment of Sub-Committee, the Executive Sub-Committee and disputes sub-committee were constituted. The Scheme for preparation of compost manure was extended to Tirukoilur besides Vridhachalam Market.

Copies of back Issues of the Madras Agricultural Journal are available. Kindly direct your enquiries to the Secretary.

THE MADRAS AGRICULTURAL JOURNAL

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