Regd. No. M. 5155

THE Madras Agricultural Journal

GOLDEN JUBILEE YEAR

Vol. XLVIII August 1961 No. 8

CONTENTS

Published by

THE MADRAS AGRICULTURAL STUDENTS' UNION,
(M. A. S. U.)
ESTABLISHED: 1911
AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE,
COIMBATORE, S. INDIA.

Annual Subscription:
Inland Rs. 8·00
Foreign Rs. 9·00

Single Copy
Rs. 0·70

THE MADRAS AGRICULTURAL STUDENTS' UNION.

OFFICE-BEARERS FOR 1960—'61.

Dr. S. Krishnamoorthi, President (Ex-officio)
Dr. B. W. X. Ponnaiya, Vice-President (Ex-officio)
A. H. Subramania Sarma, Resident Vice-President
Dr. D. Daniel Sundararaj, Editor
M. Bagavandoss, Secretary

Council

President
Vice-President
Resident Vice-President
Editor
Secretary

Mofussil Vice-Presidents

C. R. Seshadri
S. M. Sulaiman
T. S. Francis

Mofussil Members

K. R. Sundaresan
V. Subbiah
B. P. Masillamani
V. Srinivasan
P. V. Marappan

Resident Members

Dr. V. Santhanam
E. G. Sivasami
A. Sathiaraj (Editor, Tatler)
G. Meenakshisundaram
(Secretary, Students' Club)

Managing Committee

Resident Vice-President
Editor
Secretary
S. Premsekar, Treasurer
S. Sankaran, Manager
S. Muthuswamy
M. V. Jayaraman
M. Dinakaran
.....(Student)
Secretary, Students' Club

Editorial Board

Editor
Secretary
Manager
Dr. S. Kanakaraj David
Dr. D. John Durairaj
Dr. K. Ramakrishnan
A. Sathiaraj (Editor, Tatler)
G. Meenakshisundaram
(Secretary, Students' Cl

The Madras Agricultural Journal

Vol. XLVIII August 1961 No. 8

Editorial

Third Five Year Plan: Our great country has taken another step forward with the Parliament giving its assent to the Third Five Year Plan. The representatives of 440 millions of people have discussed and decided about the policies and the *modus operandi* of our third mighty adventure in building the India of our dreams. We are again girdling our loins for achieving the ambitious objective of laying sound and solid foundations for bettter economic growth and increased prosperity. These firm foundations would enable us to abolish the poverty of the masses, provide wider opportunities for gainful employment for able hands and ensure social justice without which there can be no lasting peace and stability. It is the good fortune of every one of us to take part in this great task of building a new India.

The size of the Plan with its outlay of 10,4008 crores is itself a sign of its greatness. Twenty three percent of this expenditure is earmarked for agriculture, community development and irrigation. The physical targets set by the Plan are also commensurate with its size. One hundred million tons of food grains are to be produced, 90 million acres of land are to be brought under new irrigation and 9·8 million tons of oilseeds are to be produced. Ten million tons of gur, 7 million bales of cotton and 6·2 million bales of jute are the targets for agricultural production. These will register and increase over the Second Plan average of 27·5% in the case of rice, 20% for wheat, 11% for oilseeds, 14% for cotton, 16% for jute and 18% for sugar. It is heartening to note that finances for achieving these agricultural targets would be available without limitation and that the greater emphasis which is necessary, is laid on agricultural development. This would also supply the needs of the industrial sector with raw materials. Capital would also be released in the savings on foreign exchange made through increased food production. This plan is very commendable because it will constitute to make our economy ultimately a self generating one.

Another great feature of the Plan is its perspective outlook. Economic problems have been viewed at long range. By projecting the current trends we can have a fairly clear idea of expectation and goals and this will enable us to fit in our short range plans into the long range ones. The recent suggestions for a 15 year plan will remove the regional imbalance in planning and release resources for the estimated industrial matrix and commercial complex.

Our Third Plan is also a challenge. This challenge has to be taken up and met by our agricultural scientists, extension workers and administrators. The Plan has proved beyond doubts that our agricultural potential is vast. Let us then dedicate ourselves to regenerating the rural community and training for the right type of leadership to shoulder the greater burden of the future. We are indeed proud that our State is in the forefront of many of our plan activities and specially in the fields of organising and utilising the Village Panchayats and their functions. May the Almighty bless us in this noble task.

Seepage Irrigation to Sugarcane—A new technique for higher efficiency irrigation in summer

by

S. V. PARTHASARATHY, M. SC.,

Chief Sugarcane Officer, T. A. Sugar Factory, Vadapathimangalam.

115

Introduction: Sugarcane in Madras and Andhra States is subject to drought in summer and water-logging by North East Monsoon, particularly so when it is cultivated in the wet lands of delta region. The main canals of project areas are closed for annual repairs for varying periods from February to June. The subsoil water level goes low and pumping becomes difficult and costly. The soil and atmosphere go dry and losses due to seepage or evaporation in transmitting pumped water are very high. The crops suffer by severe drought in soil and air with consequent reduction in yield and quality of juice.

Various methods of layout have been adopted in sugarcane cultivation to facilitate irrigation and for economising water. The most popular layout is the furrow system with 3'-6" spacing centre to centre. Irrigation channels are laid across the furrows at intervals of 30 to 60 ft. depending upon soil type and land slope.

Most of the sugarcane growers dig up open wells and sink bore wells to tap subsoil water for irrigation in non-monsoon periods and particularly in summer months. The usual quantity of water used up per irrigation is about 70,000 gallons per acre or roughly 3 acre inches. In many cases, the interval between irrigations is as low as 5 to 7 days, though 12 to 15 days is ideal in many cases. In extreme cases where the subsoil water source is poor, the interval may be as much as 30 days. There are rare instances where the crop receives one or two irrigations only by summer. In the case of project areas, the canals are closed for a period of one month or more and the ryots do not usually provide alternate subsoil sources for this closure period.

In the seepage irrigation described here, the principles of sub irrigation (Renfro 1958) are adopted, by creating artifically through tractor drawn implements, a favourable structure of surface soil for upward capillary movement and through vertical deep cuts for longitudinal movement of water from field channels. It is aimed at raising soil moisture to field capacity at root zone in the maximum

area within limited water and time and also to avoid the ill-effects of flood irrigation, particularly the destruction of soil structure and resulting non-soil aeration and water logging.

The Thiru Arooran Sugar factory owns a 6200 acre farm and it is subject to severe drought from February—June each year when the regular flow in canals is closed for annual repairs. Small quantities of water are made available for a short period in summer and usually this water is insufficient for spread over the entire crop area in summer. Even after adoption of known soil moisture conservation techniques, the crop suffers long periods of drought. Therefore the problem is one of spreading the water to maximum area when the water becomes available in a limited way. Techniques similar to sub irrigation were under trial.

Use of Mole Drain : In the summer of 1960, attempts were made to work the mole drain layer and form mole tunnel at 15" below surface. The implement was attached to a pan breaker worked by D4 Caterpillar. The tractor was worked, making a cut at the centre of two rows and two interspaces could be worked at a time. The plots were irrigated in the normal manner. The irrigation water quickly percolated down to the mole tunnel and it acted as a reservoir. By this method 50% more water was consumed per acre though the moisture was conserved for longer periods. One serious defect in this system was that the water traversed long distances of over 100 or 200 ft. in the tunnel and there was no immediate visible surface effect. The irrigator had no means to judge the extent of inflow and control over irrigation was difficult. Even though the soil moisture by this method was conserved effectively over a long period, the total quanitity of water consumed was greater and the time taken to irrigate a unit area was also longer than under normal system. Quite often symptoms of water logging due to heavy subsoil storage were evident. During the current year a new system was successfully adopted and by this new method we could spread the water over 3 to 5 times the area as compared to normal furrow irrigation. This system is described as "Seepage Irrigation".

Seepage Irrigation : This is a type of sub irrigation developed for regular farm practice. The sub irrigation system is generally adopted in areas where large volume of surface flow raises the level of subsoil water and creates water logging. Usually in the sub irrigation systems adopted in other countries, drainage is a concomitant problem and is adopted at periods when water is in surplus

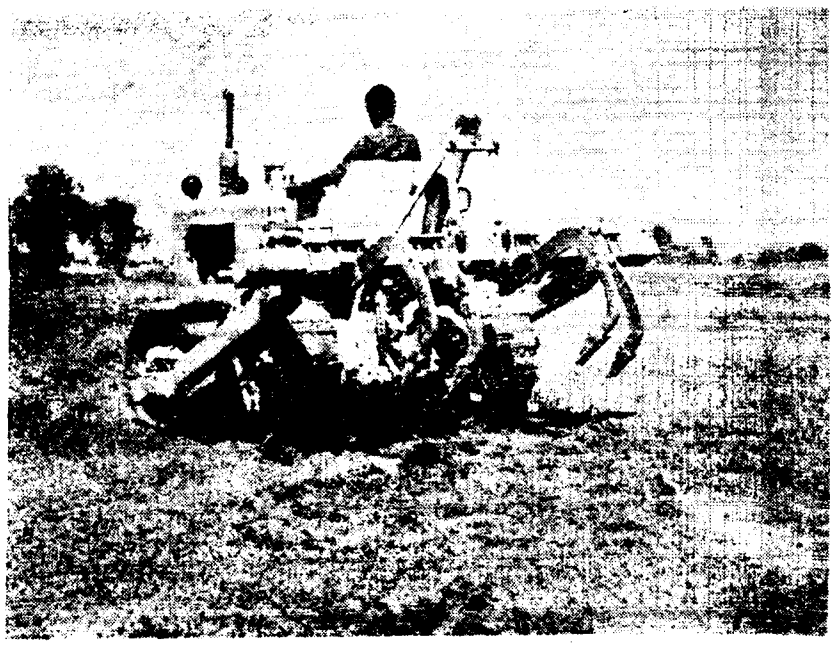


FIG. 1
'Cutter' implement in lifted up position.

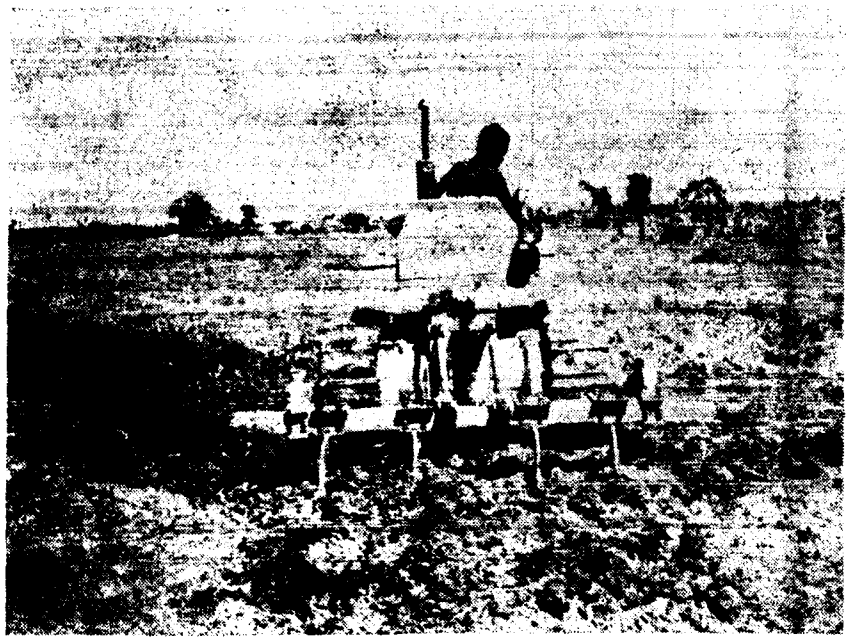


FIG. 2
'Cutter' implement in cutting position.

FIG. 3

Pan breaker with mole drain layer in lifted up position.

FIG. 4

Cross-channels with water for seepage.

and not for periods of drought. The sub irrigation may be from natural or artificial sources. The prerequisite conditions for sub irrigation are (a) the texture of soil to permit lateral or upward capillary movement of water, (b) an impervious substratum and (c) good drainage system to draw out the surplus water. The artificial sub irrigation system so far practised even in countries like America proved to be economic failures.

FIG. 5

Vertical cut between cane rows for irrigation water to seep through.

The system described here is a type combining the advantages of surface and sub irrigation systems. The soil is prepared to proper structure by tractor drawn implements and the irrigation water is applied in a manner to permit seepage effects over long distances and raising the soil moisture gradually to field capacity. The details are described hereunder.

Tractor operation : The sugarcane setts are planted in fields prepared in ridges and furrows during the months December to April. The crop needs frequent irrigation for good sprouting, vigorous tillering and growth. In Madras and other South Indian States, the crop is irrigated at intervals of 5 to 10 days depending upon availability of water. In order to conserve soil moisture, the surface soil is tilled periodically to shallow depths, alternate with each irrigation.

In TAS cane farm, the soil is heavy clay upto great depths. Under ordinary conditions vertical percolation of water is very poor. In the factory's own farm, the usual implement adopted for preparation or for interculture are the 'cutters' i. e. a heavy type of tynes that rip open the soil vertically to depth of 12" to 15". Pan breaker, of standard type serve the same purpose.

In 1961 summer, the young crop was worked up with cutters or pan breakers between rows (Figs. 1, 2, 3). This stirs up the soil to 12" – 15" depth. Three types of interculture were tried (a) single cut between rows, (b) double cut between rows and (c) single cut with pan breaker with mole drain layer. These three operations on soil were compared with normal soil in respect of irrigation by furrow method.

In seepage irrigation after working up the soil, field irrigation channels were laid out at intervals of 35', both parallel to the row and across the row. The channels were $1\frac{1}{2}$' broad by $\frac{3}{4}$' deep (Fig. 4). Water was taken through the parallel-to-the-row channel and at intervals it was blocked to fill up to the brim. By stages, all parallel and cross channels were filled up. In this method, the water is not allowed in each furrow as is done in normal irrigation practice. After 6 to 12 hours, the water in the channel seeps through laterally along the vertical openings cut by tractor implement (Fig 5). The water first travels through the cut ends opened up by the tractor implement (cutter or pan breaker) and then starts spreading both laterally and vertically by capillary action. The soil reaches its maximum water holding capacity in 6 to 12 hours. The quantity of water required under the different implement treatments is given below :

	Qty. of water per acre in gallons	Time taken per acre in number
(a) Single cut between rows.	22,400	90
(b) Double cut between rows.	26,826	108
(c) Pan breaking with mole drain—single cut between rows.	17,920	72
(d) Normal.	62,776	248

This seepage irrigation was effectively practised in 1961 and under field conditions the spread of water was 3 to 5 times with corresponding economy in water.

Special Advantages : This irrigation technique can be practised only in such cases where the crop is young and the soil can be ripped to fine tilth to a depth of atleast one foot. Double cut between rows or pan breaking with mole drain layer is found ideal. This irrigation necessitates keeping the soil in fine condition of tilth. A single tractor operation is helpful over two consecutive irrigations. Since the water does not flow over the surface of soil, the fine tilth and open crumb structure of soil are well maintained even after irrigation. The soil pore space to a depth of 9" to 12" is remaining undisturbed. The quantity of available water could be spread over 3—5 times the area. It is interesting to note that the quantity of water required per acre is less than what is required under sprinkler type. The advantage over sprinkler type is that one needs no special equipment like special pumps or sprinkler pipe lines and nozzles. Since very little water can seep down to lower layers in heavy soil condition, the plant nutrients rise towards surface with capillary action and become more easily available at the active feeding root zone. This system may lead to concentration of salts in surface layers. Since normal irrigation is feasible in these areas from June onwards such concentration of salts may be easily flushed out by June and this will lead to permanent removal of soluble salts. Further, in this cane farm, the rise of salts to the surface is mitigated by the system of trash mulching adopted extensively in all cane fields. It is also interesting to note that the soil moisture is maintained at higher level in subsoil in seepage irrigation than under normal irrigation. This reversal of soil moisture status as compared to surface irrigation leads to development of deeper roots and training the crop to resist drought.

Conclusion : Seepage irrigation is a technique that combines the advantages of the two well known methods of surface and sub irrigation. It could be adopted to all young crops of sugarcane. It helps to maximise the use of costly irrigation water in summer months and also trains the plant for drought conditions by encouraging deep rooting. The available water is spread over 3—5 times the area to raise the soil moisture to field capacity in the root zone of the young crop.

The young crop is intercultivated using D4 Caterpillar with cutters or pan breakers. This operation vertically cuts the soil to 12" — 15" depth. Field irrigation channels 1' wide by 9" deep, are then laid 35 ft. apart in criss-cross direction along and across the row. Irrigation water is let into the field channels by stages and filled to brim. After 6 to 12 hours, the water from these channels seeps out through the vertical cuts made between the two rows of cane and by capillarity, rise to surface and brings the soil to near field capacity. By this method of irrigation the open structure of soil and the soil pore space remain least disturbed atleast for two consecutive irrigations. The quantity of water utilised per irrigation is roughly ¾ to 1 acre inch.

This irrigation technique combined with surface trash mulch to soil is very helpful to overcome drought. The little available water could be spread over 3 to 5 times the area as compared to normal furrow irrigation. In saline soils, there is greater tendency for salts to concentrate near the surface. This is mitigated by trash mulching. These salts could be easily flushed out with the first irrigation when canals reopen by June or as soon as normal supply of water becomes available. Operational techniques to substitute manual labour for tractor power are under investigation.

REFERENCE

Renfro, G. M. 1958 Applying water under surface of the ground. *The Australian Irrigator* 3: 11.

Meteorological Factors Influencing Soil Temperature at Coimbatore

by

C. BALASUBRAMANIAN, KOMALAM P. NAYAR and M. V. JAYARAMAN

Introduction: With a view to study the fluctuations of soil temperature, particularly under rain-fed conditions, soil thermographs were installed at the Central Agricultural Meteorological Observatory, in field No. 61, Central Farm, Coimbatore in 1951 and data on the soil temperature at depths of 3", 6" and 12" are being collected since then. The soil in the observatory is of a red-brown sandy loam type, with calcareous substrata, even at 18" depth and moderately

alkaline. The purpose of the present preliminary study is to see how far the meteorological elements like rainfall, maximum temperature, mean air temperature, duration of bright sunshine and relative humidity affect the soil temperatures at different depths. The tentative inferences drawn are presented in this paper.

Materials and Methods: The weekly charts of the soil thermographs for a period of ten years from 1951 to 1960 were criticially examined and the data on soil temperature at intervals of two hours were compiled. For this study the data representing the noon readings have been made use of.

The daily data on maximum temperature, mean air temperature, average relative humidity, rainfall and duration of bright sunshine were also compiled and used.

Methods: The daily data were compiled on standard week basis. Dividing the year into four main periods, namely, Dry Weather Period (January and February), Hot Weather Period (March to May), South West Monsoon Period (June to September) and North East Monsoon Period (October to December), the fifty-two standard weeks were also correspondingly apportioned as 1 to 9, 10 to 22, 23 to 39 and 40 to 52 for these four periods. In regard to rainfall and number of rainy days, a day with ten cents of rain and above was considered as a rainy day.

Results: (i) The data presented in Table I represent the nature of inter-depth correlations in the different periods of the year and also in the year as a whole. Of the three depths of 3", 6" and 12" considered, positive significant correlations exist between the soil temperatures at 3" and 6" depths and 3" and 12" depths. But, between 6" and 12" depths there is no inter-depth correlation in all the seasons and also in the year as a whole. This indicates that the soil temperatures at 6" and 12" depths are affected positively by the temperature prevailing at 3" depth in all seasons throughout the year. The temperature at 12" depth is not influenced significantly by that prevailing at 6" depth, as the temperature at 12" depth is fairly steady throughout the year and the fluctuations at 6" depth are lesser than at 3" depth. Further, the correlations between soil temperature at 3" and 12" depths are more highly significant, at P = 0·01 and 0·001 levels, than those prevailing between 3" and 6" depths.

(ii) Tabular statement II contains the details of the inter-seasonal correlations of noon soil temperatures at the depths of 3", 6" and 12". The inter-seasonal correlations are highly significant with the solitary exception of the Dry Weather Period and North East monsoon period combination, at the depths of 3" and 6". Even in this combination the correlation is significant at P = 0·1 at 12" depth. The inference is that the seasonal fluctuations in the noon soil temperatures at the depths of 3", 6" and 12" are fairly rhythmic in nature, the high or low noon soil temperature at 3" depth in the different seasons indicating a similar nature of noon soil temperature at the deeper depths of 6" and 12".

(iii) A critical study of the data presented in Table III will reveal the following inferences :—

(a) *Maximum Temperature :* The annual mean maximum temperature influences considerably at the level of P = 0·05 the noon soil temperature at 12" depth. The mean maximum temperature in the South West Monsoon Period mildly influences the soil temperature at 3" depth at the level of P = 0·1. The soil temperature at 6" depth seems to be unaffected by the fluctuations in the maximum temperature in the different seasons in the year.

(b) *Mean Air Temperature :* The mean air temperature in the different seasons of the year and year as a whole, has practically no effect on the noon soil temperature at 3" and 6" depths. Only in the South West Monsoon Period it slightly influences the soil temperature at 12" depth at the level of P = 0·1.

(c) *Average Relative Humidity :* The noon soil temperature at 6" depth appears to be unaffected by the changes in the average relative humidity. The noon soil temperature at 3" depth is mildly influenced negatively by the average relative humidity, at P = 0·1, in the North East Monsoon Period. The morning relative humidity has negative correlations with the noon soil temperature at 12" depth, practically throughout the year, with exception of the Dry-Weather Period of January any February, but only at P = 0·1, the level of influence being P = 0·05 in the North East Monsoon Period.

(d) *Total Rainfall :* The noon soil temperatures at 3" and 12" depths seem to be affected by the total rainfall, only during the South West Monsoon Period, at P = 0·05 and 0·01 levels respectively. During the other seasons the effect of rainfall on soil temperature at noon is not perceptible. At 6" depth the noon soil temperature appears to be unaffected by the nature of rainfall in the different seasons in the year and also year as a whole.

(e) *Total number of rainy days :* More than the total rainfall, its distribution throughout the year, with the exception of the Dry Weather Period of January and February, fairly influences negatively, the noon soil temperature at 3" and 12" depths, particularly the latter. The noon soil temperature at 6" depth does not seem to be influenced by the nature of distribution of rains.

(f) *Duration of bright sunshine :* The noon soil temperatures at 3" and 12" depths are not affected by the duration of bright sunshine in the different seasons. Only at 6" depth it affects the noon soil temperature in the South West Monsoon Period and year as a whole, respectively at the levels of P = 0·05 and P = 0·01.

Summary and Conclusion : (i) The soil temperature at noon is practically steady at 12" depth, while the fluctuation at 6" depth is only very little, throughout the year.

(ii) There seems to be some rhythm in the seasonal fluctuations of noon soil temperatures at the depths of 6" and 12".

(iii) Out of the various meteorological factors considered, only the number of rainy days affect the noon soil temperatures at 3" and 12" depths in all the seasons, except the Dry Weather Period of January and February, while the total rainfall affects them only during the South West Monsoon Period. The maximum temperature, mean air temperature and relative humidity influence the noon soil temperatures at 3" and 12" depths in varying degrees. The temperature at 6" depth seems to be influenced only by the duration of bright sunshine during the year as a whole and during the South West Monsoon Period. It seems to be unaffected by other meteorological factors.

(iv) The noon soil temperature at 12" depth seems to be more influenced by the meteorological conditions than that at 3" depth. This finding is of great agricultural importance in understanding the Crop Weather relationship.

Acknowledgment : The authors thank Sri S. Venkatachalam, Assistant Soil Chemist, Soil Testing Laboratory, Coimbatore for analysing the soil samples. Their thanks are also due to Kumari T. P. Anna for her assistance in the compilation of the data made use of in this study.

TABLE I.

Inter-depth Correlations in different Periods.

S. No.	Details of the period	Between 3" and 6"			Between 3" and 12"			Between 6" and 12"			Remarks
		A	B	C	A	B	C	A	B	C	
1.	Dry Weather Period (January & February) ...	+ 0·69	0·26	Y2	+ 0·88	0·17	Y4	+ 0·48	0·31	N	A = Correlation coefficient B = Standard Error (S. E.)
2.	Hot Weather Period (March to May) ...	+ 0·69	0·25	Y2	+ 0·82	0·20	Y3	+ 0·44	0·32	N	C = Nature of significance Y = Significant
3.	South West Monsoon Period (June to September) ...	+ 0·63	0·28	Y2	+ 0·87	0·18	Y4	+ 0·33	0·33	N	N = Not significant
4.	North East Monsoon Period (October to December) ...	+ 0·60	0·28	Y1	+ 0·88	0·17	Y4	+ 0·26	0·34	N	1 — P = 0·1 2 — P = 0·05 3 — P = 0·01
5.	Annual ...	+ 0·64	0·27	Y2	+ 0·83	0·20	Y3	+ 0·23	0·34	N	4 — P = 0·001

N. B: Figures are given correct to two decimal places.

TABLE II.

Inter-seasonal Correlations of Noon Soil Temperatures in Different Depths.

S. No.	Correlations between	3" depth			6" depth			12" depth			Remarks
		A	B	C	A	B	C	A	B	C	
1.	Dry Weather Period and Hot Weather Period ...	+ 0·82	0·20	Y4	+ 0·88	0·17	Y5	+ 0·87	0·17	Y5	A = Correlation coefficient (r)
2.	Dry Weather Period and South West Monsoon Period ...	+ 0·74	0·24	Y3	+ 0·65	0·27	Y2	+ 0·65	0·27	Y2	B = Standard Error (S. E.)
3.	Dry Weather Period and North East Monsoon Period ...	+ 0·48	0·31	N	+ 0·55	0·30	N	+ 0·59	0·29	Y1	C = Nature of significance
4.	Dry Weather Period and Annual ...	+ 0·84	0·19	Y4	+ 0·80	0·21	Y4	+ 0·83	0·20	Y4	N = Not significant
5.	Hot Weather Period and South West Monsoon Period ...	+ 0·77	0·22	Y4	+ 0·86	0·18	Y4	+ 0·79	0·22	Y4	Y — Significant 1 — P = 0·1
6.	Hot Weather Period and North East Monsoon Period ...	+ 0·72	0·25	Y4	+ 0·78	0·22	Y4	+ 0·70	0·25	Y2	2 — P = 0·05 3 — P = 0·02 4 — P = 0·01
7.	Hot Weather Period and Annual ...	+ 0·89	0·16	Y5	+ 0·95	0·11	Y5	+ 0·92	0·14	Y5	5 — P = 0·001
8.	South West Monsoon Period and North East Monsoon Period ...	+ 0·91	0·15	Y5	+ 0·97	0·08	Y5	+ 0·96	0·10	Y5	
9.	South West Monsoon Period and Annual ...	+ 0·96	0·10	Y5	+ 0·97	0·09	Y5	+ 0·92	0·14	Y5	
10.	North East Monsoon Period and Annual ...	+ 0·65	0·27	Y2	+ 0·93	0·13	Y5	+ 0·86	0·18	Y4	

TABLE III.

Meteorological factors influencing soil temperature at depths

S. No.	Meteorological Factor	Details of the period	3" depth			6" depth			Remarks
			A	B	C	A	B	C	
1.	Maximum temperature	D	— 0.48	0.31	N	— 0.29	0.34	N	A = Correlation coefficient (r)
		E	+ 0.53	0.30	N	— 0.19	0.35	N	
		F	+ + 0.44	0.32	N	— 0.31	0.34	N	B = Standard Error (S. E.)
		G	+ + + 0.52	0.30	N	— 0.34	0.33	N	C = Nature of significance
		H	+ 0.66	0.26	Y2	— 0.45	0.31	N	N = Not significant
2.	Mean Air temperature	D	— 0.16	0.35	N	— 0.11	0.35	N	Y = Significant
		E	— 0.49	0.31	N	— 0.29	0.34	N	D = Dry Weather Period (January and February)
		F	+ — 0.57	0.29	Y1	— 0.26	0.35	N	
		G	+ — 0.24	0.34	N	— 0.42	0.32	N	E = Hot Weather Period (March to May)
		H	+ 0.29	0.34	N	— 0.49	0.31	N	
3.	Average Relative Humidity	D	+ 0.25	0.34	N	+ 0.50	0.31	N	F = South West Monsoon period (June to September)
		E	+ — 0.58	0.29	Y1	+ + 0.05	0.35	N	
		F	— 0.56	0.29	Y1	+ + + 0.17	0.35	N	G = North East Monsoon period (October to December)
		G	— 0.70	0.25	Y2	+ + + 0.06	0.35	N	
		H	— 0.58	0.29	Y1	+ + 0.43	0.32	N	
4.	Total Rainfall	D	+ 0.03	0.35	N	+ 0.20	0.35	N	H = Annual
		E	+ — 0.45	0.32	N	+ — 0.29	0.34	N	1 — P = 0.1
		F	— — 0.61	0.28	Y1	— — 0.54	0.30	Y1	2 — P = 0.05
		G	— — 0.12	0.35	N	+ + 0.49	0.31	N	3 — P = 0.01
		H	— — 0.42	0.32	N	+ + 0.17	0.35	N	
5.	Total number of Rainy days	D	+ 0.23	0.34	N	+ 0.01	0.35	N	£ = Actual value is + 0.0033
		E	+ — 0.61	0.28	Y1	+ — 0.41	0.32	N	
		F	— — 0.68	0.26	Y2	— — 0.48	0.31	N	
		G	— — 0.70	0.25	Y2	+ — 0.10	0.35	N	
		H	— 0.83	0.20	Y3	— — 0.35	0.33	N	
6.	Daily duration of bright sun-shine	D	— 0.05	0.35	N	— — 0.08	0.35	N	
		E	— — 0.06	0.35	N	— — 0.16	0.35	N	
		F	+ + 0.14	0.35	N	— — 0.66	0.26	Y1	
		G	+ + + 0.20	0.35	N	— — 0.54	0.30	N	
		H	— — 0.12	0.35	N	— — 0.90	0.15	Y3	

Research Notes

Control of Cotton Jassids by Pesticides in Rice Fallows of Madras State

Among the many pests attacking cotton, the cotton Jassid (*Empoasca devastens*. D) is a very common pest in all the varieties and is also a very important one. Its importance is emphasised because of the heavy loss it causes in the yield of Kapas. It has been estimated that 20 to 30% of the hard work and money spent by the farmer in the cultivation of cotton is sapped out by this insect. Though it is said that the insect can be adequately controlled by application of one of the many insecticides now available in the market, the selection of proper insecticide, frequency of sprayings, dilution and rate of their application are the major part of the problem for an economic and effective control of this pest.

With this point in view, observations were made for three years (1956–1958) at the Agricultural Research Stations, Aduthurai, Palur and Coimbatore for finding out the optimum spraying schedule for cotton raised as an off seasonal crop in the Rice Fallows of Madras State. Six varieties of Hirsutums viz. Deltapine–15 and Coker (U. S. A. types); P. 216 F and H. 14 (Punjab types): MCU–1 and MCU–2 (Madras types and two pesticides Endrin and Parathion (Folidol) formed the material for study. The varieties were raised in duplicate plots located at a distance from each other so as to be outside the reach of the drift during the spraying operation in one of the plots. Both plots were raised under identical conditions of cultivation. One set of the plots received three rounds of sprayings with pesticides–the first two with Endrin and the third spraying with Folidol (Parathion compound) adopting a concentration of one ounce Endrin in 6½ gallons of water and one ounce of Folidol in 12½ gallons of water respectively. The other set of plots was left as control (without any sprayings by pesticides). Counts of Jassid nymphs on a population of 100 leaves (Third to fifth position of the leaves on the main stem) and plot yields were recorded after last spraying in both control and treated plots.

It is evident from the results that the combination of Endrin and Folidol reduces Jassid incidence in all the varieties appreciably, as a consequence of which ***Kapas***-yield of the varieties has increased. A comparison of nymphal population between varieties indicates marked varietal incidence. The American types Coker and Deltapine–15 are badly affected by jassids while the incidence in the Punjab and Madras types viz. H. 14, P. 216 F, MCU–1 and MCU–2 is only moderate. On the average, there is a reduction of nymphal population from 91 to 31 per unit population of leaves, i. e. by 65% and a substantial increase in the yield of *Kapas* from 675 lb. to 940 lb. per acre or by 38% by means of adopting proper and timely plant protection measures.

The average cost of spraying per acre amounted to Rs. 26·18 nP. while the net income per acre due to extra yield as a consequence of plant protection against jassids with Endrin and Parathion is estimated as Rs. 93/- per acre.

The protection against jassids by pesticides pays for its costs and brings many times extra profit to cultivators.

Acknowledgment: The experiment described in this note formed part of the work carried out in the Rice Fallows Scheme, with the financial assistance of the Indian Central Cotton Committee. The help and guidance of the Committee are gratefully acknowledged.

N. VENKATARAMAN,
R. KRISHNAMURTHY,
H. S. JAWAD HUSSAIN, and
V. SIVASUBRAMANIAM.

Studies On the Use of Purified Merck Activated Carbon in the Colorimetric Estimation of Soil Phosphorus

In the Soil Testing Laboratories, the available Phosphorus in soils is estimated colorimetrically using Olsen's Reagent as extractant (0·5 Molar solution of Sodium bicarbonate adjusted to pH 8·5). As the soil extract obtained is often of a brownish colour, thereby interfering in the quality of colour developed, a decolourising agent, Darco-G-60 - a variety of activated carbon low in phosphate ions - is added to obtain a clear extract. Presently, Darco-G-60 has become a scarce product and available only at exhorbitant prices.

With a view to find a cheaper and suitable substitute, attempts were made to utilise 'Merck' activated carbon as a decolourising agent. Though Merck activated carbon is known to be of excellent quality and freely available in the market, it contains appreciable amounts of adsorbed phosphate ions, limiting its use in phosphorus estimation. To devise a suitable procedure for freeing the adsorbed phosphate ions from the activated carbon, the following leaching experiment was carried out:

Olsen's reagent and HCl. (1 : 10) were employed as leaching agents. To 10 gms. each of the activated carbon (Merck), 100 cc. of Olsen's reagent and 100 cc. of HCl. (1 : 10) were added in separate beakers, stirred and kept overnight. The solutions were filtered next day. Then the residue on the filter-paper was alternately washed with 50 cc. of distilled water and 50 cc. of the respective reagents. In all the cases the leachates were retained for estimating the phosphorus leached out in each

portion and noting the progress of leaching. The phosphorus was colorimetrically estimated in 5 cc. of the leachate, as in the estimation of available phosphorus in soils (Dickman & Bray 1941).

It was observed that with the use of 300 cc. HCl. (1 : 10) and 200 cc. of distilled water for leaching, the phosphorus concentration in terms of Klett reading (as measured in Klett Summerson photo-electric colorimeter) dropped from 700 to 6, whereas in the case of Olsen's reagent, even after leaching with 500 cc. of the reagent and 350 cc. of distilled water the Klett reading dropped only from 640 to 21, thereby proving the superior efficiency of acid solutions in leaching out phosphate ions from the activated carbon.

In order to test whether the alkaline reagents are capable of dislodging further phosphate ions from the carbon leached with HCl. (1 : 10), it was again treated with Olsen's reagent after making it free of acid and the phosphorus present in the leachate was estimated. The results showed only a very slight increase in phosphorus leached out by Olsen's reagent, indicating that most of the phosphate ions are washed out by HCl. treatment.

The comparative performance of activated carbon after treatment, in the routine estimation of soil phosphorus was also tested. To two soils high in phosphorus and to two low in phosphorus, 100 mgms. each of Darco-G-60 and the leached activated carbon were added as decolourising agents and the Klett readings noted are given below.

Soil Sample No.	Klett readings	
	Darco	Merck purified carbon
1135	5	5
8623	62	65
1111	104	107
1128	7	9

Conclusion: Activated carbon (Merck) high in phosphorus content can easily be made free of phosphate ions by leaching with HCl. (1 : 10), alternated with distilled water. The efficiency of the leached carbon as a decolourising agent is not impaired by the method suggested.

Soil Testing Laboratory,
Aduthurai, 1—5—1961.

C. K. RAJAGOPAL and
K. P. SRINIVASAN

REFERENCE

Dickman S. R. & Bray R. R. 1941 The colorimetric estimation of phosphorus in soil — *Ind. Engg. Chem. Anal. Edn.* **12**, 665.

A Note on the Variations in Tendrils in *Tetrastigma sulcatum* Gamble

The genus *Tetrastigma* of Vitaceae does not bear tendrils on peduncles and differs from the allied genera *Ampelocissus* and *Vitis* both of which bear tendrils on peduncles (Gamble 1918; Fyson 1932).

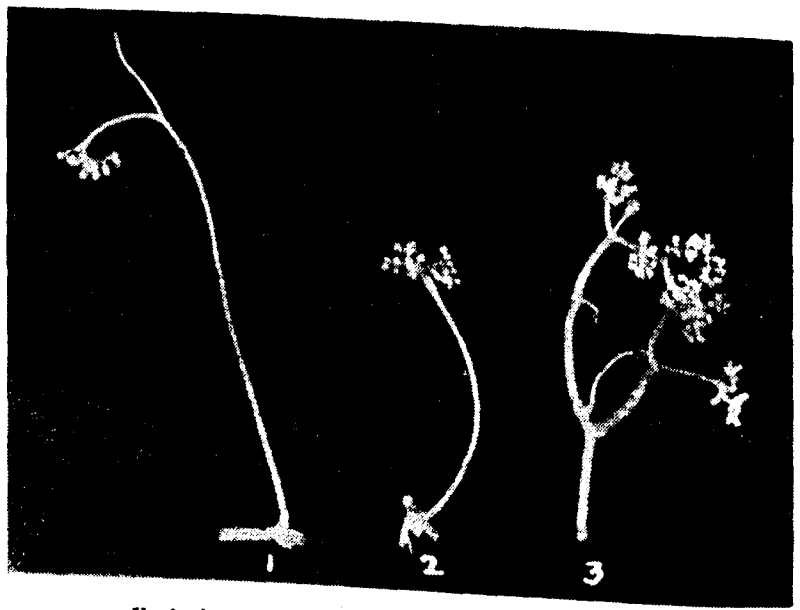
According to Strasburger (1930) tendrils and inflorescences in *Vitis vinifera* are terminal in position and further growth is by sympodial branching. He has recorded the frequent occurrence of intermediate forms between tendrils and inflorescences in *Vitis vinifera.*

The purpose of this note is to record similar intermediate forms between tendrils and inflorescences in *Tetrastigma sulcatum.* In *T. sulcatum* grown at the Agricultural College Orchard, Coimbatore the following variations were recorded.

1. *Tendril with peduncle:* A branch of the tendril instead of ending normally, bears a group of flowers of which more than 75% are fertile (Fig. I–1.)

2. *Tendrilar peduncle:* Some of the branches starting as tendrils end in flowers. Except a few, all the flowers are found to be fertile. This type of variation seems to be a new record in the family Vitaceae (Fig. I–2).

Fig: 1.



Variations in Tendrils of Tetrastigma sulcatum.
1. Tendril with peduncle. 2. Tendrilar peduncle.
3. Peduncle with tendrils.

3. *Peduncle with tendrils:* Another interesting feature observed in this plant is the presence of tendrils on the peduncle. These tendrils are comparatively short and they appear to be sterile branches of the peduncle. Almost all the flowers are fertile (Fig. I–3).

These variations show that the tendril in *T. sulcatum* is a modification of the inflorescence. This agrees with the view of Worsdell (1915) that the tendril represents a modified inflorescence axis in *Vitis vinifera.*

Botany Section, Agricultural College & Research Institute, Coimbatore-3, 29—4—1961.

E. A. SIDDIQ,
G. THULASIDAS.

REFERENCES

Gamble, J. S. 1918 *Flora of the Presidency of Madras.*

Fyson, P. F. 1932 *Flora of the South Indian Hill Stations.* Government Press, Madras.

Strasburger, E. 1930 *Strasburger's Text Book of Botany* (revised by Hansfitting *et al.*) Macmillan & Co. Ltd., London.

Worsdell, W. C. 1915 *The Principles of Plant Teratology* Dulau & Co. Ltd., London.

A Cheap New Device for Remote Controlling of the Water Supply Pump

The Agricultural College & Research Institute Campus is served, for its water supply, by a 21,000 gallon reservoir located inside the gas house premises. Water is pumped into it by means of a turbine pump which is nearly 2,000 feet away. Due to this considerable distance between the borewell and the reservoir, it is not always possible to ensure that the pump is stopped in time before the reservoir gets to overflowing. This results not only in waste of water but also in the surrounding areas getting slushy. A remote control was therefore found essential to stop the pump automatically when the tank got just full.

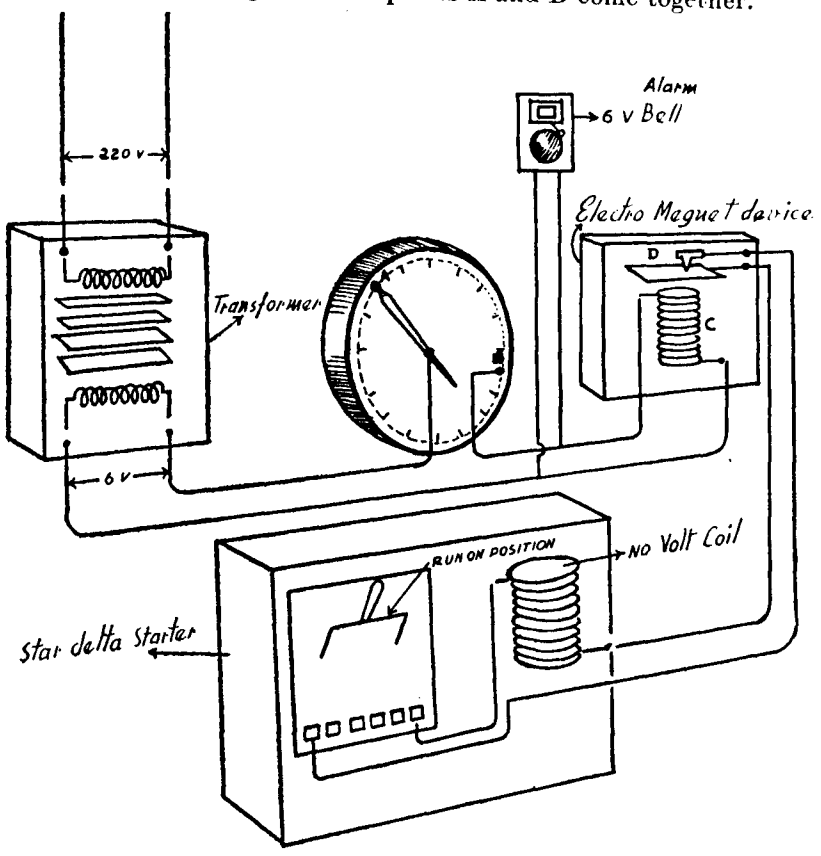
It is usual to effect such a control through an electrical overhead line spanning the entire distance of 2,000 feet which, in turn, will cost about Rs. 5,000/-. The staff of the mechanical engineering section were therefore faced with a situation of extreme importance in having to device a cheap remote control to stop the pump automatically when the tank gets filled.

The hydraulic pressure in the pumping main itself was considered for providing a suitable control which utilised the deflection of a pressure gauge needle located in the pump. When the tank gets full, the pumping

main is closed automatically by a float valve in the reservoir at the gas house while the pump continues to work. This creates an increase of hydraulic pressure causing the required deflection of the needle. This completes a small electrical circuit through an electromagnet which, in turn, disconnects the main supply to the starter. The starter trips automatically and pump stops working.

A special feature of this device is that the alarm bell will continue to ring even if by some mischance, the other control fails. This will naturally cause the pumpset driver to know that no more pumping is necessary.

The sketch shows the diagram of connections among the various components of the device. The 220 volt main supply is stepped down to a 6 volt supply and is connected across the deflection points A and B. Completion of the circuit occurs when the needle point A touches point B due to increased hydraulic pressure. The actual control unit consists of an electromagnet C and a metal leaf D. The latter gets attracted when the magnet is energised when points A and B come together.



Schematic sketch showing electrical connections.

The starter handle which is kept in the running position by the no volt coil is released to the 'stop' position when the above energising takes place.

The alarm bell which is in parallel with the electromagnet unit will also function independently giving the required caution to the pumpset driver.

The economic benefits, arising out of this device, are two-fold :—

What would have cost nearly Rs. 5,000/- was reduced to an outlay of about Rs. 100/- only in terms of equipments for this new device which has completely eliminated a long distance overhead electrical line of 2014 feet. It follows also that with this equipment for water supply arrangements, distance between reservoirs and pump houses is of no matter at all and this aspect of economy is of distinct value to municipalities and townships having water supply lines extending over many miles perhaps. There is no need for the pumpset driver to wait for long hours at the pumphouse until the reservoir gets filled up. Once the pumpset is started, the driver can leave the place and attend to his other chore of duties leaving the device to take care of stopping the unit when the tank is full.

Agricultural College and Research Institute, Coimbatore.

T. V. KALYANASUNDARAM,
S. E. ANANTARAMAN.

A New Occurrence of Caseworm on Arecanut in Coimbatore District

Arecanut palm grown round about Mettupalayam in Coimbatore district is not hitherto subjected to the attack of any important pests. Occasionally young trees exhibit symptoms of attack by some scale insects namely *Pinnaspis aspidistrae* and *Chionaspis dilatata*. Sometimes grey arecanut beetle *Aroecerus fasciculatus* D. does some damage to the nuts (Ramakrishna Ayyar, 1940).

At Mettupalayam a severe infestation of caseworm was reported on Arecanut plants of 6 to 7 years old in 4 acres. The caseworm larva has done extensive damage not only to fronds but also on the main trunk and adjacent Banana plantations. The caterpillar moves on the edges of the frond making perforations initially and ultimately scraping away the entire green matter leaving only the midrib and sideveins.

Larva: The larva grows to a length of 3 to 4 cms. and is light brown in colour and later turns black. The case of the larva is very tough and dirty white in colour. The pupation is in the case and during emergence of the adult the pupa is seen protruding out with an emergence hole at the terminal position.

Control: Of all the insecticides tried viz. B. H. C. spray, Endrin and Parathion, it was found that Parathion (1 oz. in 12½ gallons of water) gave very good control of the pest. The cost of the chemical for treating an acre of Arecanut works out to about Rs. 35/-.

This is a new record of a caseworm on Arecanut in Madras.

S. VENUGOPAL and
V. VENUGOPAL.

REFERENCE

Ramakrishna Ayyar, T. V. 1940 *Handbook of Economic Entomology for South India*. Supdt. Govt. Press, Madras.

THE
"GOLDEN JUBILEE CELEBRATIONS"
OF
THE MADRAS AGRICULTURAL STUDENTS' UNION
AND
THE MADRAS AGRICULTURAL JOURNAL
AND
THE 44th COLLEGE DAY AND CONFERENCE
for 1961
will be held during the first week of
December 1961.

AGRICULTURAL JOTTINGS FOR SEPTEMBER, 1961.

We look forward to the month of September which is a break period when south west monsoon ends and the retreating monsoon is yet to begin early in October. This is a conventional way of forecasting, yet farmers are aware of the many vagaries in the behaviour of the north east monsoon witnessed during the past in South India with its storms and cyclones. We look forward for normal weather conditions and good crop prosepects in the rabi season to commence now.

K. 6 Pandyan Cotton:

For quite a long time, the cotton breeders at Coimbatore and Koilpatti have been working on the improvement of the Tinnevelly and Karunganni cottons, with a view to evolve an *arboreum* strain having a wide range of plasticity suitable for cultivation in the southern and central districts of our State. Their aim was to hit at a cotton type having a good staple length of over 15/16" and also with high ginning percentage and good spinning qualities. The work which has been going on for over a decade, has resulted in a very good strain called K. 6. and named Pandyan. Up till now, it was not possible to evolve any strain that could be successfully cultivated in both the Tinnevelly and Karunganni areas which extends over 1.2 million acres and therefore K 2 and K 5 were the two strains which were under cultivation for a long time in these two regions. This new strain K. 6 has been found to thrive very well in both these regions. Not only so, it also excels the existing strains of K 2 and K 5 in all respects and has a marked improvement over them for yield and quality. During the course of trials, K 6 Pandyan gave an average yield of 372 lb. per acre as against 324 lb. from K 2 and 222 lb. from K 5. This new strains has a ginning percentage of 33 and a mean fibre length of 9/8 inch. It can spin 33s spinning count as against 27s for K 2 and K 5.

It is thus seen that K 6 Pandyan is an outstanding performer and its multiplication and spread would unify the cultivation of high quality cottons in South India. With the new cotton type MCU 3 (9030G Pongal) suitable to the irrigated areas and for the dry areas, Madras now is on the threshold of a new era of quality cotton cultivation of improved staple qualities which would put more money in the pockets of our farmers and at the same time place Madras, in the Cotton map of India as an important state, growing quality cotton.

As was mentioned in a previous note, the multiplication and spread of improved cotton seeds is a slow process requiring 3 or 4 generations of cotton in as many years before the seeds can be multiplied in reasonable quantities to meet the needs of the farmers. The work of multiplication has already been started long before and our farmers can very soon look

forward to the improved K 6 Karunganni cotton seeds. You are requested in the meanwhile to contact your Extension Officer before you start on your new cotton crop and enquire whether the seeds of this new strains are available with him.

How To Prepare A Good Tobacco Nursery:

The preparation of a tobacco nursery to produce good and healthy seedlings has always been a problem with our farmers. This is so, because, the tobacco seeds are very small and delicate and require a very carefully and properly prepared seed bed for their good germination and the seedlings have to be nursed well to grow and develop into fine seedlings. Side by side, they have to be carefully watched and protected from the very deadly 'damping off' disease in the early stages consequent on which the young seedlings are apt to die and perish leading to complete failure of the nursery. These are some of the problems facing the raising of a good tobacco nursery. With a view to obtain fine, disease - free seedlings, therefore, some of the following suggestions may be adopted.

The seeds are first dipped for 15 minutes in a weak silver nitrate solution (obtainable from a nearby Chemist's shop) prepared by diluting one part of silver nitrate with 100 parts of water. This somewhat helps to ward off some fungus diseases like black shank. At the site of the nursery, after the soil is well dug, rubbish is heaped and burnt. This is called 'Rab burning'. This helps to sterilise the nursery and destroy all the soil organisms that may be present in the nursery and damage the seedlings. The clods in the nursery are to be very well broken to get an excellent tilth before sowing. Generally, the nursery beds are made about 4 to 6 ft long or even smaller and about 3 or 4 feet broad, which facilitates easy reach with the hand from both the sides for sowing, watering or for chemical treatments. Raised seed beds are prepared and manuring is usually done with sieved wood ash.

After the beds are well prepared, the tobacco seeds are mixed with sand to facilitate uniform and thin sowing, as the seeds are very small. Usually a teaspoonful of seeds is mixed with about 20 times the volume of sand. After sowing the seeds the nursery beds are pressed with the palm of the hand to make the surface firm and also cover the seeds. Water is then slowly sprinkled on the surface with a rose can and the sprinkling is done both in the morning and evening till good germination takes place.

With a view to protect the seedlings from the 'damping off disease', nurseries are drenched with Bordeaux mixture 5-5-60 or 1% strength once or twice during the early growth of the seedlings. These precautions would result in reasonably good and healthy seedlings fit for transplanting.

Manuring of Thaladi Paddy Crop:

Generally, a second crop of paddy that immediately follows another paddy crop, gives a poor yield. This is so because the preceding paddy crop would have removed all the available plant nutrients from the soil in a poorer condition than before even though a field may be very fertile. If therefore a very good yield is to be got from this crop (called in Tanjore district as the Thaladi crop), it is necessary to give a heavy dose of manures and fertilisers.

Normally all paddy crops should receive about 5000 pounds of green leaf and it is important that the Thaladi crop also receives this quantity if not more wherever it could be managed. It is usual to grow sesbania green manure crop on the borders and plant gliricidia on the bunds and these two sources would meet the green manure needs of this crop. Growing of *gliricidia* shrubs in vacant places in a farm where other crops are not grown is a good idea to provide green matter for the Thaladi crop. What is emphasised here is that all efforts should be made to provide enough green manure for this thaladi crop. The application of super phosphate at 150 lb. per acre is also quite essential for the Thaladi crop. This has been stressed in a previous note also and the importance of phosphates in plant nutrition for good yields is obvious. The super phosphate is applied behind the plough before the last puddling. In places where there is deficiency of potassium as indicated by the soil tests, muriate of potash at 50 lb. per acre should also be applied. Nitrogenous fertilizers are quite essential for the thaladi crop generally, even though green manure is applied. The recommendation is to apply 150 lbs. per acre of ammonium sulphate or 30 lb. N when other forms of nitrogenous fertilisers like urea, calcium ammonium nitrate etc., are applied. One third of the nitrogenous fertiliser is to be applied at the time of transplanting and the remaining 100 lb. is applied in two equal doses, the first one month after planting and the second one week before flowering. This divided application facilitates the supply of the essential plant nutrient, nitrogen as and when required by the paddy crop. When proper manuring is done, the crop comes up well.

It is important that prophylactic measures against pests and diseases are adopted for the Thaladi crop as this crop is susceptible to many pests and diseases. A combined plant protection schedule to combat both diseases and pests was given in a previous note which may be referred to.

Grow the New Sweet Potato Varieties:

Four high yielding sweet potato varieties have been isolated by the Horticulture Section at the Agricultural College and Research Institute, Coimbatore which are found to be superior to the local varieties in respect of higher yields and tuber quality. Variety V. 1 is a

Chinese variety with white skin and white flesh and the cooked flesh is creamy white, sweet and fibreless. It has recorded yields upto 29,800 lb. per acre compared to 10,000 pounds obtained from local.

V. 6 is another Chinese variety but has red skin and creamy flesh. The cooked flesh is yellow, sweet and fibreless. This has recorded a yield of about 27,500 lb. per acre.

V. 8 is an American variety with white skin and creamy flesh. Cooked fiesh is creamy, sweet and nonfibrous. This variety has given a very high yield of more than 30,000 lb. per acre.

V. 12 is also another Chinese variety having light brown skin and creamy coloured flesh. Here also the cooked flesh is creamy, sweet and nonfibrous. This also has recorded an yield of 30,000 lb. per acre.

It is important to note that sweet potatoes are heavy feeders and remove large quantities of plant nutrients from the soil. Heavy applications of about 200 lb. amonium sulphate per acre have responded well where the soil is of low fertility. Superphosphate at 150 lb. per acre and muriate of potash at 100 lb. per acre could also be applied for increasing tuber yields. These two are applied as a basal dressing along with 20 cart loads of cattle manure.

New Gingelly Strains:

While raising a Gingelly crop, it is always good to cultivate some of the more important strains of Gingelly evolved by the Oilseeds Specialist at Coimbatore. These improved strains have been evolved from local types by selection and therefore have the inherent ability to yield more than the local types to which farmers are accustomed to grow. Some of them are also resistant to diseases. Three popular strains, namely TMV 1, TMV 2, TMV 3 have been evolved and TMV 1 and TMV 2 are suitable to be grown under rainfed conditions preferably during the north east monsoon. TMV 1 gingelly seed has an oil content of 50 percent and plants are fairly bushy with moderate branching habits and produce four loculed pods. Seeds vary in colour from red to black. This gives a fairly good yield of about 400 lb. per acre. Duration is about 85 days.

TMV 2 gingelly seeds contain a higher percentage of oil of 52 percent. Plants are open with moderate branching habits, the capsules are cylindrical with 6 to 8 locules. Seeds are dull white in colour. The duration is 80 days. This gives a fairly good yield of about 375 lb. per acre.

TMV 3 is a strain suitable for summer months to be grown under irrigated conditions. The crop duration in 80 days and gives very good yields upto 500 lb. per acre. The oil content is also high at

52 percent. The plants are bushy profusely branched with medium size capsules, closely set. The seeds are medium sized and dark brown in colour.

Further details of cultivation and seeds of these improved strains can be had from your nearest Extension Officer.

A Manuring Programme for your Coconuts:

Every one is interested in getting more coconuts from their coconut trees, wherever they are grown, either in their own house compounds or topes. Coconut palms respond very well to good manuring, particularly for the reason that coconut soils become deficient in the major plant foods very soon. Continuous yielding of coconuts year after year result in a continuous removal of plant foods from the soil, necessitating proper manuring for maintaining good yields or for increasing production. It pays to heavily manure coconut gardens because coconuts now fetch a good price.

Firstly it is important to satisfy that the coconut gardens have a good amount of organic matter in the soil. Growing of green manure crops will go a long way to solve this problem. Sunnhemp is an ideal green manure crop for this purpose. This can be grown between the coconut trees easily. Where it is not possible to grow a green manure crop, another method of supplying organic matter is by forming basins around the coconut trees and applying large quantities of green leaf brought from outside which may be applied along with other fertilizers and then covered. For this purpose growing of Gliricidia along the borders in a coconut tope will help to supply the green matter requirements to the coconut trees. In two or three years time after planting gliricidia shrubs, sufficient quantities of green leaves can be got for application.

Regarding application of fertilisers, the following general recommendations are given:

	Kilograms of fertilisers per seedling or tree per annum		
	Ammonium sulphate	Super phosphate or bone meal	Muriate of Potash
First year after planting	Fertiliser applied in the pit while planting		
	0·25	0·25	0·25
Second year	0·25	0·25	0·25
Third and fourth year	0·50	0·25	0·50
Fifth and Sixth years	1·00	0·50	0·75
From Seventh year onwards	1·50	1·00	1·00

The organic matter and fertilisers are applied in circular trenches 2 feet broad and one foot deep, dug 3 to 5 feet away from the stem and applied along with the green leaves at the rate of 100 lb. per palm and profusely irrigated in regions where necessary. The trenching and subsequent application of fertilisers should be carefully done without injuring the root system.

Pretreat Your Cotton Seeds :

'Prevention is better than cure'. The occurence of many diseases could be prevented by suitable prophylactic treatment of the seeds from which the disease is likely to occur or liable to spread.

Of the various diseases affecting cotton the 'black arm' is a serious and deadly disease. It is a seed borne disease which can be effectively controlled by pre treatment of the seeds with the organo-mercuric compound 'Agrosan'. An ounce of the chemical is required for treating 20 lb. of seeds. The seeds are put in a seed dressing drum along with the chemical and rotated for about ten minutes. In the absence of a seed dressing drum, a mud pot may be used in which the seeds and chemical are put and the mud pot rotated a number of times. The chemically treated seeds can then be treated with cowdung or red earth paste afterwards to facilitate easy sowing.

It should be noted that 'Agrosan' is a very poisonous chemical and therefore should be handled with care. It should not be touched by hand. The hands should be well washed after seed treatment. The mud pot used for mixing the chemical should not be used for any other purpose even after washing. The seeds after treatment should not be stored in gunnies which are likely to be used for storing grain etc. The treated cottons seeds should not on any account be fed to cattle.

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

Weather Review — for July, 1961.

RAINFALL DATA (IN INCHES)

Region	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam) ...	7·8	+ 4·2	14·7
	Tirurkuppam*	7·8	+ 3·3	15·0
	Vellore	4·6	+ £	13·1
	Gudiyatham*	2·8	— 1·2	13·1
East Coast	Palur*	5·2	+ 2·0	15·7
	Tindivanam*	6·9	+ 3·4	15·1
	Cuddalore	3·9	+ 1·3	18·7
	Nagapattinam	2·0	+ 0·3	13·7
	Aduthurai*	0·4	— 2·2	15·5
	Pattukkottai*	2·3	— 0·5	13·2
Central	Salem	2·8	— 1·0	12·2
	Coimbatore (A. M. O.)* ...	6·7	+ 3·6	18·2
	Coimbatore	6·5	+ 4·8	19·0
	Tiruchirapalli	1·9	+ 0·8	10·3
South	Madurai	0·2	— 1·8	11·4
	Pamban	0·1	— 0·4	9·4
	Koilpatti*	0·4	+ 0·2	14·7
	Palayamcottai	0·6	+ 0·2	11·9
	Ambasamudram*	2·6	+ 1·3	25·0
	Nagercoil*	8·2	+ 3·5	38·6
	Capecomorin*	5·6	+ 3·0	32·3
Hills	Kodaikanal	5·2	+ 0·6	24·4
	Coonoor*	6·7	+ 3·5	35·4
	Ootacamund* ...	14·3	+ 7·9	35·7
	Nanjanad*	29·5	+ 16·2	57·4

1. * Meteorological Stations of the Madras Agricultural Department.
2. + £ = Actual value = + 0·02.

The Madras State received either scattered or localised showers throughout the month of July, 1961 except on 7—7—1961 when the weather was mainly dry.

The day temperatures were practically steady.

The noteworthy rainfall and zonal rainfalls are furnished hereunder :—

Nanjanad received 5·40" of rain on 3—7—1961.

Zonal Rainfalls (in inches)

Name of the Zone	Rainfall for July, 1961 (inches)	Departure from normal	Remarks
North	5·8	+ 1·5	Above normal
East Coast	3·5	+ 0·7	do.
Central	4·5	+ 2·1	do.
South	2·5	+ 0·9	do.
Hills	13·9	+ 7·1	Far above normal

From the Agricultural Meteorologist, A. C. & R. I., Coimbatore - 3.

Departmental Notifications

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

Name and Designation	Posted or Transferred to
Sri K. M. Vijayan, Asst. Mycologist	Assistant Mycologist, Paddy Helminthosporiose scheme, Coimbatore.
,, V. K. Appaji, Sugarcane Specialist (on leave)	Sugarcane specialist, Cuddalore.
,, S. Venkatachalam, Assistant Soil Chemist, Coimbatore	Deputed to U. S. A.
,, N. M. Thyagarajan, Lecturer in Chemistry	Deputed to U. S. A.

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

Sri M. Anandam	A. E. O., Athoor II, Madurai District
,, K. Annamalai	A. E. O., Attur, Salem District
,, S. Arjunan	A. E. O., Shoolagiri
,, T. Arumugham	A. E. O., Gudalur
,, M. P. Balakrishnan	Plant Protection Asst., Ooty.
,, N. Bashyam	Farm Manager, State Seed Farm, Dondathur
,, V. S. Chockalingam	A. E. O., Tiruvadanai
,, A. S. Dandayutham	Farm Manager, Agrl. Res. Stn., Bhavanisagar
,, D. Dhanasingh	Plant Protection Asst., Trichy
,, V. Dharmalingam	A. E. O., Perambalur
,, K. Isaac	A. E. O., Pudukottai
,, R. Jaganathan	Chemistry Asst. (Ghee grading), Rasipuram
,, C. R. Lakshminarasimhan	Chemistry Asst. (Ghee grading), Erode
,, N. Lakshminarayanan	A. E. O., Tiruvalangadu
,, N. Muthuswamy	A. E. O., Vanur
,, M. Rajappa	Farm Manager, State Seed Farm, Vanur
,, K. Raju	Spl. Agrl. Demonstrator (Sugarcane), Vridachalam
,, M. Ranganathan	A. E. O., Kaverippakkam
,, A. Sachidhanantham	A. E. O., Bhuvanagiri
,, A. K. Sheik Ahmed Hussain	A. E. O., Vikravandi
,, I. P. Sridharan	Plant Protection Asst., Polur
,, V. N. Srinivasan	A. E. O., Polur
,, P. S. Subbiah	A. E. O., Madurantakam
,, Jalaludeen	A. E. O., Kandili
Sri A. Tirugnanasambandam	A. E. O., Theagadurgam
,, G. Parthasarathy, Farm Manager, Kappalur	A. E. O., Melur
,, J. F. George, Spl. A. D. (Sugarcane) Tiruppathur	Technical Asst. to Cane Development Officer, Madras.
,, S. Viswanathan	Spl. Agrl. Demonstrator, Tirupathur
,, R. Ramakrishnan, A. E. O., Vellakoil	Farm Manager, Sheep Farm, Ootacamund
,, K. Ramachandra Menon, Farm Manager, Sheep Farm, Ootacamund	Soil Conservation Asst., Jedarpalayam, Salem
,, H. Lewino Devasahayam, Farm Manager, Meragur	Paddy Asst., Peravurni
,, A. V. S. Srinivasan, A. E. O., Sattur	A. E. O., Sedapatti
,, M. A. Alagiriswamy, A. E. O., Sedapatti	Marketing Asst., Madurai
,, V. Krishnamurthy, A. D., Sankarapuram	A. E. O., Lakshminaickenpalayam
,, T. Purushothaman, Karur	A. E. O., Musiri
,, S. Thangavelu, Tobacco Dev. Asst., Coimbatore.	Millet Asst., Koilpatti
,, C. N. Subramaniam, Farm Manager, Bhavanisagar	Tobacco Dev. Asst., Coimbatore
,, S. Venkatapathy, A. E. O., Lakshminaickenpalayam	Chemistry Asst., Urban Compost Scheme, Coimbatore
,, K. Somasundaram (Trainee)	Soil Conservation Asst., Kulithalai
,, K. S. Sardarsahib, Soil Conservation Asst., Kulithalai	A. E. O., Athoor II
,, N. P. Chellappa (Trainee)	Soil Conservation Asst., Kundah Project, Coonoor
,, K. Raju, Soil Conservation Asst., Coonoor	A. E. O., Cuddalore
,, T. Elumalai (Trainee)	Soil Conservation Asst., Sathyamangalam
,, T. V. Balasubramaniam, Soil Conservation Asst., Sathyamangalam	Farm Manager, Agrl. Res. Stn., Bhavanisagar
,, D. R. Parthasarathy (on leave)	Soil Conservation Asst., Panruti
,, G. Balakrishna Pillai, Soil Conservation Asst., Panruti	Paddy Asst., A. R. S., Palur
,, R. Padmanabhan, A. E. O., Kandili (on leave)	Instructor in Agri., Krishnagiri
,, T. Upendran, Spl. A. D., Karur	Plant Protection Asst., Trichy
,, M. S. Ramakrishnan, A. E. O., (on leave)	A. E. O., Sathur
,, P. Raghunath	A. D., Anakkavur
,, H. Balasubramaniam, Soil Conservation Asst., Valkanatham	Soil Conservation Asst., Palliconda
,, C. Shanmugavinayagam, Soil Conservation Asst.,	Soil Conservation Asst., Bodinaickanur.
,, M. Sethu, Soil Conservation Asst., Bodinaickanur	A. E. O., Nilakottai
,, K. M. Rakkan, A. D., Anakkavur	A. E. O., T. Palur

Sri S. V. Srinivasan, Farm Manager, State Seed Farm, Keeranthi	Farm Manager, Agricultural Research Station, Bhavanisagar
,, M. M. Kurian,	A. E. O., Ulundurpet
,, C. N. Ramaduri, A. E. O., Ulundurpet	Instructor Agricultural School, Agricultural Research Stn., Bhavanisagar
,, K. C. Thomas, Instructor, Agricultural School, Agrl. Res. Station, Bhavanisagar	Assistant Lecturer in Agronomy, A. C. & R. I., Coimbatore
,, A. John Knight (on Return from U. S. A.)	Farm Supervisor, Rural Exten. Training Centre, T. Kallupatti
,, S. Balasubramaniam, Farm Supervisor, Rural Exten. Training Centre, T. Kallupatti	A. E. O., Palani
,, P. Gnanasigamani, A. E. O., Thiruvidamaruthur	Instructor, Rural Extension Training Centre, Krishnagiri

The following persons have been selected for the Post-Graduate Training at the A. C. & R. I., Coimbatore.

Sri R. Appadurai	Selected for Ph. D., Plant Breeding and Genetics.
,, R. Jayarajan	,, ,, Plant Pathology.
,, S. Kulandaiswamy	,, ,, ,, ,,
,, S. Jayaraj	,, ,, Entomology.
,, M. A. Chinnadurai	,, ,, Soil Science.
,, P. S. Sanjeevi	Selected for M. Sc., (Ag.), Agronomy.
,, K. N. Chinnaswamy	,, ,, ,, ,,
,, M. R. Irudayaraj	,, ,, ,, ,,
,, J. Krishnamurthy	,, ,, ,, Plant Breeding and Genetics
,, T. Ramanathan	,, ,, ,, ,, ,,
,, S. Premsekar	,, ,, ,, ,, ,,
,, C. Nagarajan	,, ,, ,, ,, ,,
,, N. Shanmugham	,, ,, ,, Plant Pathology.
,, M. Guruswamy	,, ,, ,, Soil Science.
,, S. Premnathan	,, ,, ,, ,,
,, P. V. Subba Rao	,, ,, ,, Entomology.
,, A. H. Abubakkar	,, ,, ,, ,,
,, T. Govindarajan	,, ,, ,, ,,
,, C. R. Nagarajan	,, ,, ,, Horticulture
,, T. M. Venkataraman	,, ,, ,, ,,

Postings of Farm Management trainees in the State Seed Farm

Sri P. Vijayakumar	Velapakkam, S. A. District.
,, S. Balasubramaniam	Tirukadaiyur, Thanjavur District.
,, M. K. Periaswamy	Mulluvadi, Salem.
,, V. Subramaniam	Manimuthar, Tirunelveli.
,, T. V. Sasikumar	Pullur, Ramnad District.
,, S. K. Murugayan	Bhavani.
,, V. Rajagopal	Athyandal, N. A. District.
,, K. Ramadoss	Kondathur, Thanjavur District.
,, Bashyam	Sakottai, Thanjavur District.
,, S. Ranganathan	Devambalpattinam, Thanjavur.
,, P. S. Purushothaman	Moongilkudi, Thanjavur District.

Review of market conditions of commercial crops in the Madras State for the month of July 1961.

Cotton :

COIMBATORE DISTRICT : *Season :* There was good rainfall throughout the District. The rainfall was beneficial to the standing crop of groundnut.

Arrivals and Transactions : Kapas : The kapas market at Tiruppur had an opening stock of 26,198 quintals of Cambodia and 3555 quintals of Karunganni kapas, the total arrivals were 38830 quintals of Karunganni kapas. The despatches were 39175 quintals of Cambodia and 2455 quintals of Karunganni kapas, leaving a stock of 25853 quintals of Cambodia and 1701 quintals of Karunganni kapas.

The lint market opened with 40693 quintals of Cambodia lint and 152 quintals of Karunganni lint. Arrivals were 38944 quintals of Cambodia and 743 quintals of Karunganni lint including 6657 quintals of Cambodia and 601 quintals of Karunganni lint locally ginned. Despatches were 35,693 quintals of Cambodia and 237 quintals of Karunganni lint, leaving a balance of 43944 quintals of Cambodia and 658 quintals of Karunganni lint.

Prices : The prices of Kapas and lint per quintal were as follows :

Cambodia Kapas from Rs. 130 to 150.
Karunganni Kapas from Rs. 110 to 120.
Cambodia lint from Rs. 280 to 350.
Karunganni lint from Rs. 260 to 270.

RAMANATHAPURAM DISTRICT : *Season :* Hot sun and dry weather followed by warm nights prevailed almost throughout the month with stray occasional showers throughout the district. Sowing of winter groundnut were delayed due to lack of rains during July 1961.

Arrivals and Transactions: The following were the arrivals and disposals of cotton kapas and lint during the month.

	Opening Stock	Receipts	Disposals	Closing Stock
Kapas	2,500	43,650	42,500	3,650
Lint	1,875	10,220	10,760	1,335

Prices: Kapas:

Lakshmi kapas	Rs.	98.60	—	104.00	per 100 kgs.
Karunganni kapas	,,	93.33	—	102.66	,,
Karunganni 2nd crop	,,	60.00	—	91.33	,,
Tinny	,,	64.00	—	91.33	,,
Uganda 1st qlty.	,,	100.00	—	130.66	,,
Uganda 2nd qlty.	,,	90.00	—	103.33	,,

Lint:

Karunganni Best		N. A.			
Karunganni Average	Rs.	247.00	—	268.00	
Tinny	,,	210.00	—	225.00	
Uganda	,,	288.00	—	326.00	

TIRUNELVELI DISTRICT: *Season:* There was a rainfall of 10 mm. at Koilpatti and 20 mm. at Sankarankoil.

Arrivals and Transactions:

Cotton Kapas Market	Crop	Opening balance	Arrivals	Disposals	Closing
Koilpatti	Karunganni	15335	7050	5050	17335
Sankarankoil	Uganda	350	11918	8950	3318
Cotton Lint:					
Koilpatti	Karunganni	3984	1140	1800	3324
Sankarankoil	Uganda	50	4550	1250	3350

The price of cotton kapas and lint were as follows:

Kapas:	Karunganni	Rs.	95.00	—	107.00	per 100 kgs.
	Uganda	,,	118.00	—	120.00	,,
Lint :	Karunganni	,,	240.00	—	258.00	,,

SOUTH ARCOT DISTRICT: *Season:* Widespread rains were received in almost all places of this district. Savings of winter groundnut were in progress and harvest of summer crop was accelerated.

Arrivals and Transactions: Arrivals of summer crop were on the increase. The total arrivals amounted to 10752 tonnes. Despatches amounted to 4980 tonnes. Consumption by oil mills and chekkus was 3254 tonnes and 478 tonnes respectively. The closing stock was 2843 tonnes.

RAMANATHAPURAM DISTRICT: *Arrivals and Transactions:* There was an opening balance of 5970 quintals and 7865 quintals were received. After disposals during the month the closing stock was 3835 quintals of kernels. The price ranged between Rs. 83 to 93 per quintal of kernels and Rs. 25 for pods.

NORTH ARCOT DISTRICT: *Season:* Widespread and scattered rains were received intermittently throughout the month all over the district. As a result of the same, sowings of winter groundnuts were taken up extensively and is continuing. There were good arrivals and disposals of pods and kernels and the prices were steady.

TIRUCHIRAPALLY DISTRICT: There were no rains. The arrivals of groundnut kernels in the Regulated Markets of Jayankondan and Ariyalur were 6089.59 and 534.38 bags respectively. The prices of groundnut kernels ranged between Rs. 242 to 277 per candy of 240.85 kgs.

Gingelly:

The arrivals of gingelly in South Arcot District totalled to 3735 bags. Despatched to the other districts amounted to 593 bags. The oil mills and chekkus consumed 1487 and 1492 bags respectively. The stock with trade at the end of the month was reported to be 801 bags. The price per bag of 80 kgs. ranged from Rs. 94.38 to 105.00.

Tobacco:

In Coimbatore, there was a stock of 40901 quitals of chewing and 3310 quintals of cheroot tobacco. About 6395 quintals of chewing and 420 quintals of cheroot tobacco were exported to outside centres.

The tobacco market was moderately active with limited demand from consuming centres.

Prices: (per quintal)

Meenampalayam	Rs.	177	—	242
Other Varieties	,,	132	—	230
Cheroot Varieties	,,	177	—	231
Chewing Tobacco-Pit cured	,,	200	—	261

Cardamom:

MADURAI DISTRICT: There was good rainfall in the Cardamom plantation areas in Madurai district. The condition of the crop was good.

Prices: Bodinaickanoor: Medium quality. Rs. 7·25 to 8·10 per lb.

Review of administrative activities of Market Committees, July, 1961

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

Enforcement :

Name of the Market Committee		Section 5(1) A	Section 5(1) B	Section 5(3) A	Section 5(3) B	Weighment A	Weighment B
1. South Arcot	...	236	1,706	190	1,120	161	983
2. North Arcot	...	121	1,022	114	981	45	488
3. Coimbatore	...	145	1,339	117	1,050	30	530
4. Tiruchirapalli	...	103	1,437	94	1,309	87	1,140
5. Tirunelveli	...	30	215	6	94	24	198
6. Ramanathapuram	...	33	456	16	397	15	315

N. B. A. Licenses issued during the month.
B. Licenses issued upto the month.

Meetings : The second ordinary meeting of the Coimbatore Market Committee was held on 7th and discussed 24 subjects. The important resolution passed was for the purchase of suitable sites at Palladam and Dharapuram for location of market yards.

The third ordinary meeting of the Tiruchirapalli Market Committee was held on 23rd. In this meeting the committee recommended that the control over the purchase and sale of tobacco might be lifted in all the taluks of this district except the taluk of Karur where tobacco is largely grown.

College and Estate News

Vanamahothsava : A very impressive and effective mass planting for Vanamahothsava Celebrations was done by the students and staff on 19—7—'61. The Dean and the Additional Director of Agriculture inaugurated the Celebrations by planting a coconut seedling.

Independence Day Celebrations : The 15th Independence Day was celebrated on a grand scale with the flag hoisting done by the Dean. The College N. C. C. got up a very smart march past and the Dean took the salute. In his speech the Dean stressed the importance of the efforts on the part of the staff and students to build a glorious India. A fine carnival was put up and the celebrations were brought to a close by a free film show in the evening.

Students' Club Elections : The following office bearers were elected by the Students Club for 1961—62.

1.	Sri G. Meenakshisundaram	— Club Secretary
2.	,, A. Pappuraja	— Games Secretary
3.	,, A. Sathiaraj	— Editor the "Tatler"
4.	,, R. Kaliappa	— P. G. Representative
5.	,, J. C. Bose	— Final year Representative
6.	,, Gajapathi	— II year Representative
7.	,, Utharraju	— I year Representative
8.	,, Chandrasekharan	— I year (Integrated) Representative
9.	,, M. H. Khan	— Debating Society Secretary
10.	,, Nadanam	— Social Service League Secretary
11.	,, K. Janakiraman	— Hiking Society Secretary
12.	,, Meerzainudeen	— Photographic Society Secretary

"Freshers' Social" : The welcome function for the new students of this college was celebrated with a 'tea' by the senior students on the 2nd September. There was an entertainment by the Juniors.

Orientation Week : The orientation week was inaugurated by Dr. S. Krishnamurthi, Dean, Agricultural College and Research Institute on the 2nd September. All the ward tutors and the College students were present. In his address Dr. S. Krishnamurthi reiterated the need for the students and the staff living together in the College Campus as a happy family for better education, understanding and discipline.

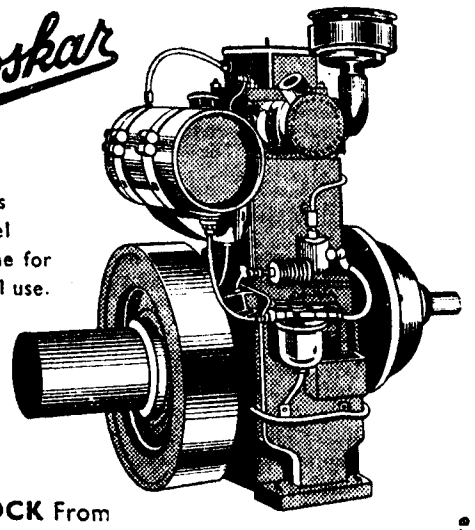
Laying of the foundation stone for the College Stadium : The College will have a stadium of its own in the maidan very soon. The Central Government has made a grant for the same and the students, as a condition, must put in some work by themselves in the erection of the building. The students have willingly and enthusiastically done the excavation themselves for the foundation. The foundation stone was laid by the Dean and Additional Director of Agriculture, Dr. S. Krishnamurthi on 2nd September 1961.

Inauguration of activities of the Students' Club for the year 1961—'62 : The activities of the Madras Agricultural College Students' Club for 1961—'62 were inaugurated on the evening of 4th September, 1961 by Sri N. Mahalingam, B. SC., A. M. I. E., M. L. A. He delivered an interesting and illuminative address. Dr. S. Krishnamurthi, Dean presided over the function.

Flood Relief Fund : The Students of the College, on their own and among themselves collected money for the Chief Minister's Flood Relief Fund. On behalf of the students Dr. S. Krishnamurthi, Dean presented the cheque for a sum of Rs. 1,735/- to the District Collector of Coimbatore.

Admission for the Post-Graduate Course : The admission for the Post-Graduate courses was completed on 24—8—1961 and the M. Sc., (Ag.), and the Ph. D. Students have joined the course during the first week of September 1961.

Kirloskar



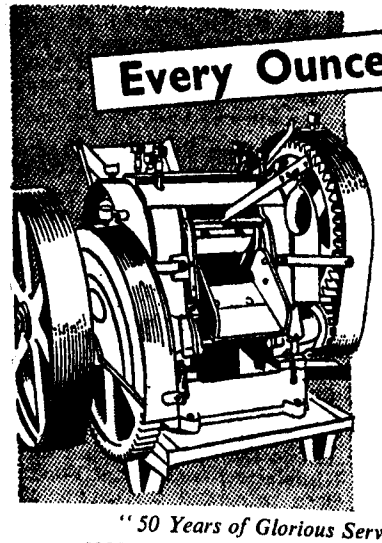
Kirloskar 5 B.H.P. Series II Single Cylinder Diesel Engine. The ideal Engine for agricultural and industrial use. Suitable for operation of pumps, hullers, oil ghannies and industrial machinery.

Available **EX-STOCK** From

PARRY & CO. LIMITED

P.O. Box No. 12, Madras.
P.O. Box No. 506, Bombay
P.O. Box No. 208, Calcutta.
P O Box No. 172, New Delhi.

PK765B



Every Ounce Counts!

Kirloskar

ESTD. 1888

SUGARCANE CRUSHERS FOR MAXIMUM EXTRACTION

Kirloskar Sugarcane Crushers symbolise efficient and economical operation. Finest material and excellent workmanship make these crushers, the best buy for your money. Manufactured in two types to suit the varied requirements. Available in 7 sizes — 4 power driven and 3 animal driven models.

"50 Years of Glorious Service to the Nation"

KIRLOSKAR BROTHERS LIMITED

KIRLOSKARVADI DIST., SANGLI.

Control all your crop pests with

Folidol-E605

Formulated in India by:
BAYER-AGROCHEM LIMITED,
Post Box No. 1436,
BOMBAY-1.

BAYER

Regional Distributors: **Messrs. A. V. THOMAS & CO. LTD. P. B. No. 47. ALLEPPEY.**

Edited and Published by Dr. D. Daniel Sundararaj, B. sc. (Ag.), M. sc., Assoc. I. A. R. I., Ph. D., for the Madras Agricultural Students' Union and Printed by A. Subramaniam, at The Coimbatore Co-operative Printing Works, Ltd., Coimbatore.

B

(1)	(2)	(1)	(2)