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A GREEN MANURE CROP OF SESBANIA

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CONTENTS

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Editorial

Newer frontiers in Agricultural Sciences: The next symposium for the ensuing College Day and Conference to be held in August of this year at Coimbatore is on the intriguing subject of "What next in Agriculture". We have had many enquiries as to what exactly is expected under the caption. To our knowledge the major part of the symposium should be devoted to the "big ideas", that the big and the small in Agriculture, would have to put forth on the various branches of Agricultural science. In this connection, we would like to draw the kind attention of our readers to our Editorial in the March issue of this Journal on "What is your big idea?". The ensuing symposium offers to one and all the great opportunity to put forth their "big ideas", for the future development of the Agriculture of our State. The main object is to give a new look to Agriculture and to reach newer frontiers in the different fascinating facets of this science.

Great changes and adjustments have taken place in Agriculture and its science in the recent past and newer horizons have been reached with the enlargement in its varied branches. Mechanisation, for example, is one of the main advances which arrests our attention first and foremost. Tractors and other Agricultural machinery have come into use more and more. Contraptions and modifications to suit the conditions in every tract have also come into vogue. Even in wet areas where the tractor could not ordinarily get in, gadgets like the "hydraulic muledozer" have been introduced to enable the easy cultivation of rice and sugarcane fields. So the farmers of the future have to increase their production through intensive cultivation of the areas already available

in order to keep up with the increased investments they would have to make on their tractors and farm machinery. It is here that the other Agricultural sciences step in to help them.

The Biologists working on plants give them better seed material through evolved strains. They also give the farmers varieties of plants which withstand drought, disease and other similar adverse conditions. In the days past the farmers were helpless against these and had few weapons to combat pests and diseases. Now, they can not only have such genetically fortified seeds, but also have enough pesticides to wrangle with all the common maladies of the plant.

Above all, the newest horizon in the frontiers of Agriculture is the one opened out through Agricultural chemicals. Chemicals for a variety of purposes as fertilisers, hormones, pesticides and herbicides have come into use. 2, 4. dichloro-phenoxy-acetic acid more generally known as "2, 4-D" is a weed killer in one concentration while it is a hormone, auxin or growth regulator at another lower concentration. There are many such phenoxy compounds now in use. These compounds can intensify the colour of the fruit, can make petals stay longer, increase the water retaining power of the plant, make fruit ripen earlier and can totally prevent the formation of fruit on ornamental trees. It is explained that these compounds can not only accelerate the respiration of plants but also increase the activity of the plant enzymes and cause the accumulation of simple forms of carbohydrates. Another recent entrant in the Agricultural field is the Antibiotics like aureomycin, terramycin and others, which have proved as growth promoters at low doses in animals and plants. Though their use in animal and human diseases are well known the the newest finding is the discovery that these antibiotics can combat plant diseases as well.

All these advances have given a technical revolution in our farming practices and we have to accept the challenge of changing Agriculture and bring forth a newer outlook in all branches of the science in our State.

Studies on a Few Proprietary Preparations of Benzene Hexachloride (BHC)

by

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Benzene hexachloride (BHC) — ($C_6 H_6 Cl_6$ – hexachlorocyclohexane) was discovered by 1941 in France. to have high insecticidal properties. This formulation is built up of mainly five isomers, of which the 'Gammaisomer' (constituting about 10–12%) possesses outstanding lethal properties against insects (Slade 1945).

BHC was available in commercial quantities in India by about 1947 and has shown much promise in the control of a number of major pests. The demand for this insecticide in plant protection has increased considerably during recent years. It may be interesting to note that the quantity distributed by the department alone during 1953–54 in the residuary State of Madras worked to about 900 tons, not to speak of the purchases made by the farmers from outside agencies. A number of firms are at present importing this chemical from abroad and are putting the same on the market under various trade names, without any authorised tests being conducted regarding the claims made for their products. The Planning Commission in their report on the First five Year Plan have rightly pointed out the need for organised guidance regarding the use of pesticides by competent agencies of the Government after due investigations in this regard.

In this note, the date gathered on the analysis of nine samples representing three proprietary brands of BHC as well as a gist of the results obtained in biological tests are furnished.

(i) **Analytical Tests:** Random samples of the different formulations were taken from consignments received from time to time at this institute for research purposes. These were got analysed for percentage of technical BHC contents and also gamma isomer contents, wherever possible, by the kind courtesy of the Plant Pathologist at the laboratory of the Plant Quarantine and Fumigation Station (Government of India), Bombay. The results are furnished as an Appendix.

(ii) **Biological Tests:** The insecticidal efficacy of the three brands specified above was also assessed simultaneously. To mention just a few instances, these investigations were conducted both under laboratory as well as field conditions against the cholam earhead bug – *Calacoris angustatus* L, chilljes thrips – *Scirtothrips dorsalis* H. – the red cotton bug – *Dysdercus cingulatus* F, the tobacco thrips – *Thrips tabaci* L —, the castor semilooper – *Achoea janata* L —, the tobacco caterpillar – *Prodenia litura* F —, the earhead blister beetle – *Lytta tenuicollis* P and the sunhemp flea beetle – *Longitarsus belgaumensis* G. The dusts were used as such while the wettable powders were tried at two concentrations, viz., one pound in 6·5 and 13 gallons of water (0·1 and 0·05% gamma BHC spray).

As a detailed account of the experiments conducted against the above pests and the data gathered, falls entirely outside the purview of the present paper only a gist of the technique followed and the results obtained are furnished below.

(a) *Laboratory Tests:* The technique adopted in these tests is that of the direct spraying with the help of an atomiser, or dusting method with the use of a piece of fine muslin. The test insects, mentioned above, were collected as and when they appeared in a pest form, in suitable containers. These were subsequently introduced into glass jars (8" x 4" size) and treated at the concentrations indicated in the above paragraph. The treated insects were made to remain in contact with the spray fluid or the dust for about five minutes, after which time they were transferred to fresh glass jars and fed with their normal food. Counts regarding the mortality of the test insects were recorded after an interval of 48 hours.

(b) *Field Tests:* The field investigations were mainly intended to check up the observations made in the course of the laboratory trials. Infested crops, were treated at the rate of about sixty gallons of the spray fluid or about 20–25 lb. of the dust per acer, whenever the above mentioned test insects occured in a pest form. The insect population was estimated before and forty eight hours after the treatment by examining random samples, of affected parts of the plants, so as to cover two per cent of the experimental area. As it would be impossible to make a record of the dead insects, under field conditions, the efficacy of the three different brands was assessed with reference to the reduction in the population of the pest, after the treatment.

The percentage of mortality in the case of the laboratory trials and the reduction in the percentage of the pest population in the course of the field trials, ranged from 92 – 100 under the three brands.

Conclusions: From the analytical data presented in the appendix and judged by the results of the biological tests conducted in this State, it is evident that there is very little difference in the comparative merits of the three proprietary products of BHC that were tested, viz., "GAMMEXANE", "HEXAMAR" and "HEXIDOL". The individual variations in the gamma isomer content of a particular concentration, amongst the three brands, are quite insignificant. The choice, therefore, lies in the price factor.

It is expected that in the interest of maintaining the reputation of the firms concerned, they would stick up to the standards presented above and would not lower the quality of the products in their eagerness to offer a lower quotation.

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APPENDIX

Results of analysis of three proprietary brands of BHC.

Name of proprietary preparation	Technical BHC. content	Gamma isomer content	Ph. of carrier
BHC (Gammexane) D025 — Imperial Chemical Industries	5·2%	0·70%	7·2
Hexamar BHC 5%—Bharat Pulverising Mills	4·8%	0·65%	7·3
Hexidol 805 — Geigy Insecticides	5·3%	0·71%	7·1
BHC (Gammexane) D120 — Imperial Chemical Industries	9·8%	1·34%	7·3
Hexamar BHC 10%—Bharat Pulverising Mills	9·6%	1·32%	7·2
Hexidol 810 — Geigy Insecticides	10·1%	1·36%	7·2
BHC (Gammexane) P520 — Imperial Chemical Industries	49·9%*	(a)	
Hexamar BHC 50% wettable powder — Bharat Pulverising Mills	49·10%*	(a)	
Hexidol 950 — Geigy Insecticides	50·52%*	(a)	

Note: (*) BHC content — (W/W basis).

(a) The gamma isomer content of the wettable powders is not determined, as on extraction of the wettable powder the technical BHC so obtained is always mixed with the other organic chemicals (like the wetting agent) used in the formulation of the powder. The wettable powders are upto specifications with regard to wettability, suspensibility and acidity as set down by World Health Organisation in their Fourth Report of the "Expert Committee on Insecticides".

Method of analysis: Two methods are followed for the estimation of the gamma isomer content. Both are polarographic methods, but differ from each other only in the method of preparation of the solution of the technical BHC for polarography. The methods are described in detail in the references (1 and 2) cited.

Causes of Poor Viability in a few Grass Seeds

by

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The seeds of South Indian grasses have in general low percentages of germination; many of these have less than 40% viability and some even less than 10% (Chandrasekharan *et al* 1950; Rajesekhara Mudaliar *et al* 1954). *Cenchrus ciliaris* and *Cenchrus setigerus* which are the notable species of grasses of the Kangayam tract and which are recommended for development and improvement of pastures, have very poor germination. To find out the causes of the poor germination capacity of important grass seeds, their dormancy periods were first studied; it was found that these grasses showed satisfactory germination only after about 12 to 15 months of dormancy. While *C. ciliaris* gave 10–20% germination after one year of storage, *C. setigerus* gave a maximum of only 8% (Rajasekhara Mudaliar *et al* 1953), To find out whether the involucre of bristles of the spikeletes in the *Cenchrus* sp. has anything to do as mechanical barrier in the germination of seeds, these investigations were carried out.

Cenchrus ciliaris, *Cenchrus setigerus* and Blou buffel *(Cenchrus* sp.) were taken as the material for study. Spiklets are generally considered as seed for sowing in grasses and these were collected at different seasons, viz., January 1952, January 1953, November 1954 and June 1954, and dissected to note the percentage of grain setting.

The dissected grains, both well developed and poorly developed were soaked in water for sixteen hours and then kept separately for germination in seed testing trays, with another set of whole spikelets kept as control.

1. **Grain Setting:** On dissecting the spikelets, it was found all the spikelets did not have grain setting. Further, in cases where there was grain setting, there were both fully developed and poorly developed grains. Table I shows the percentage of grain-setting in the three species of grasses taken up for study.

It is seen from the data presented in Table I that the grain-setting in the spikelets is only about 42% in *Cenchrus ciliaris;* 38% in *Cenchrus setigerus* and 35% in *Cenchrus* sp; (Blou buffel). Of these

the well-developed grains are only 24·4, 28·4 and 20 percentages respectively. There is no appreciable difference in the setting of grains in the different species and for each species in different seasons.

2. **Germination Trials:** In the germination tests conducted with the three sets viz., (a) well developed grains, (b) poorly developed grains and (c) the whole spikelets as such for each of the species of *Cenchrus*, well developed grains alone showed very good germination while the poorly developed grains failed to germinate.

The percentages of germination worked out on (a) the well-developed grains (b) the total number of germinated grains both well-developed and poorly developed out of 100 spikelets tested out and (c) the whole spikelets as such are presented in the table II.

The following are the observations that could be drawn from the data presented:

1. Whole spikelets have given the poorest germinations viz., 4·4% for *Cenchrus ciliaris*; 1% for *Cenchrus setigerus* and 6·8% for *Cenchrus* sp (Blou buffel) on an average.

2. The well-developed grains show good percentages of germinations of 87; 86·2 and 85·3 percentages respectively for the three species.

Discussion and Conclusion: Whole spikelets as such giving very low percentages of germination when compared to high percentage of germination obtained from well developed grains bring out that the involucre of bristles have some mechanical obstruction. This is further evident from the nature of the involucre in the three species under study. *Cenchrus setigerus* has the toughest involcure, *Cenchrus ciliaris* a medium tough and Blou buffel (*Cenchrus* sp) a soft involucre and the average percentages of germination are 1, 4·4 and 6·8 respectively for the whole spikelets of the above three species. When there is no appreciable difference in the setting of well-developed grains and the germination of the well-developed grains in the three species, the mechanical obstruction caused by the involucre of bristles appears to be responsible for the difference in the germination percentages of the whole spikelets of the three species. Such mechanical obstructions affecting germination have been recorded by Crocker 1906 and Shull (1911) in *Xanthium*.

TABLE I.

Percentage of grain-setting; Poorly developed and well developed seeds in *Cenchrus* sp. collected at different dates.

No.	Name of seeds	Jan. 1952		Jan. 1953		Nov. 1953		April 1954		June 1954		Average		Total
		Well developed	Poorly developed	Well developed	Poorly developed	Well developed	Poorly developed	Well developed	Poorly developed	Well developed	Poorly developed	Well developed	Poorly developed	
1	*Ceuchrus ciliaris* (local) ..	25	29	26	23	19	12	29	7	23	15	24·4	17·2	41·6
2	*Cenchrus setigerus* ..	39	6	34	4	25	14	17	13	27	13	28·4	10·0	38·4
3	Blou buffel (cenchrus sp.) ..	18	27	16	15	23	13	12	9	31	12	20	15·2	35·2

TABLE II.

Percentage of Germination in developed grains and in spikelets as a whole, collected at different dates.

No.	Species	Jan. 1952		Jan. 1953		Nov. 1953		April 1954		June 1954		Average	
		In well developed grains	In spikelets as a whole	In well developed grains	In spikelets as a whole	In well developed grains	In spikelets as a whole	In well developed grains	In spikelets as a whole	In well developed grains	In spikelets as a whole	In well developed grains	In spikelets as a whole
1	*Cenchrus ciliaris* (local) ..	84	5	92	7	79	4	93	4	87	2	87	4·4
2	*Cenchrus setigerus* ..	64	0	91	2	92	1	95	2	89	0	86·2	1
3	Blou buffel (*Cenchrus* sp.) ..	56	5	87·5	11	91	16	92	6	100	6	85·3	6·8

It appears from the data presented that the low percentages in *Cenchrus* species are due to two causes: (1) the poor setting of grains in the spikelets (there are only 20 to 25% setting of well-developed grains) and (2) some mechanical obstruction caused by the involucre of bristles of the spikelets.

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A Review of the Soil Studies on Deccan Black Soils and the Effect of Irrigation on them

by

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Introduction: The black soils of India have received attention from all soil workers for a long time. Probably on account of its colour, and its importance in cotton cultivation the black soil type was one of the earliest to be subjected to intensive study.

Objective: In this paper an attempt is made to present in a compact, cogent form, the results of voluminous pieces of work which have been done by several Agricultural Chemists at Madras in succession for well over 40 years now. The work has had a marked pedological emphasis, and is fundamental in perspective. None the less, its importance as the starting point for the solution of all soil problems cannot be over-emphasised.

Studies on Deccan Black Soils: (1) INVESTIGATIONS ON ORIGIN OF BLACK COLOUR: (a) Annett: (1910) attributed the colour

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of black soils to the presence of titaniferous magnetite in the coarse fraction of the soil. But his work was mainly representative of black soils from Madya Pradesh and Bombay, and not of Madras. Moreover his investigation was primarily confined to the laboratory. (b) Harrison and Sivan: (1912) on the other hand, started their investigation with extensive tours of black soil areas, within Madras State, recording observations on the sub-soils and the underlying rocks. They divided the soils examined into five areas of which the Deccan was one. Laboratory examination revealed that, while the black soils were similar in properties, their origin was different in different tracts. It was also observed that the presence of titaniferous magnetite could account for black colour only in the case of Bombay soils, and not Madras soils. Thus they observed that the soils of Bombay and Madya Pradesh originated from trap rock while those of Madras traced their origin to diverse geological formations of local importance. Harrison and Sivan deduced, moreover, that the black colour of Madras soils was associated with a colloidal complex of organic matter and a double silicate of Iron and Aluminium.

The work of Harrison and Sivan made a distinct contribution to the then existing knowledge of the suject. It must however be mentioned, that their work related only to a study of surface soils with particular reference to the cause of the black colour. Although underlying rock formations were observed during the study, detailed correlation between the nature of the rocks and the soils arising therefrom had not been attempted. With the advent, two decades later, of the Russian concept of soil science, with main emphasis on the study of the soil as a unit by itself, the Chemistry Section of the Madras Agricultural Department fell in line with workers in other parts of the world, and commenced work on soil profiles opened up in representative tracts of the State.

(2) ORIGIN OF BLACK SOILS, TUNGABHADRA SOIL SURVEY: (a) *Juxta-position of Black and Red Soils:* The Tungabhadra Project area in the Ceded Districts was one of those examined elaborately by the Chemistry section. One hint that was offered by this examination was that a possible correlation could be worked out between the parent rock and the soil type it gave rise to. In a published report of this soil survey, Ramiah (1937) divided the soils of the area as black and red, deep and shallow, with and without gypsum, basing this division on criteria such as colour, depth and salt content. A striking feature observed during the

survey was the occurrence, side by side, of black and red soil patches, apparently as independent entities, with clear lines of demarcation.

This interesting phenomenon had been explained by observers in a number of ways. Some, probably under the influence of the Russian school of thought emphasizing the importance of climate, believed that topography was a determining factor; according to them, red soils were formed first and black soils were derived later from them by transportation. But during the Tungabhadra soil survey, black soils were encountered at altitudes of 1,500 feet, and vast stretches of red soils were found occurring at lower levels. Thus the topography theory was found unsatisfactory.

(b) *Conclusions from Tungabhadra Soil Survey:* The survey, with its elaborate data regarding a very considerable number (440) of soil profiles, was admirably suitable for throwing light on the associated occurrence of black and red soils, and their colour. It was deduced that, the black soil organic matter might be present in combination with calcium silicate complex of the clay. The country rocks in the area were mainly granites and gneisses; red soils were observed to be formed in the vicinity of rocks of predominant potash felspar content, while black soils were associated with other minor occurrences of hornblende schist, trap dykes, highly basic gabros, and also with limestones of Vindhyan age. Thus, it was evident that black soils were derived from rocks rich in calcium and magnesium, while red soils originated from rocks low in these elements, but high in potassium.

(3) Colour of Black and Red Soils: Ramiah and Raghavendrachar (1937) observed that both the black and red soils contained almost the same amount of iron, while, ordinarily, one would expect red soils, on account of their colour, to contain more iron. They concluded that high silica sesquioxide ratios and high lime contents were not by themselves causes of the black colour, but that this composition gives clay of light grey colour, which, in combination with even small amounts of organic matter, develops the black colour.

(4) Detailed Investigation on Origin and Geochemistry of Soils of Madras Deccan: Anantanarayanan (1941) investigated the origin of Madras Deccan soils elaborately and studied their geochemistry at length. Soil samples obtained during

the Tungabadra soil survey were utilised for the investigation. His work could be described under four broad heads.

(i) Morphology of Deccan soils, (ii) Dynamics of soils, (iii) Minerological composition of soils, (iv) Composition of clay minerals.

(i) *Morphology of Deccan Soils:* The study included a detailed analysis of the soil profile and several horizons. It was concluded that the Madras Deccan black soils were closely similar to the Chernozems of Russia and the Black Prairie soils of North America. The main difference was the dissimilarity of parent material granite for Madras soils and loess in the case of chernozems. According to the scheme of classification put forward by Sigmond at the International Congress of Soil Science, 1939, both black and red soils of Madras Deccan are soils of mixed origin, or "organic mineral soils", the former belonging to sub-group "Humic siallites" under calcium soils and main type "black soils", and the latter coming under the sub-group "Siallites", order "Red earth" and type "Red soil".

(ii) *Dynamics of Deccan soils:* The mechanism of soil formation was sought to be followed up by a study of the chemical and mechanical composition of soil types, and the parent rock responsible for their formation. It was observed that black soils had a lower free silica content and a higher combined silica content than red soils. Black soils had a higher silica-sesquioxide content than the red. They had a high content of calcium both as silicate and as carbonate as also of magnesium and sodium. Moreover, black soils had a high percentage of fine fractions, high water-holding capacity, and a low distribution of water-soluble salts in the top three feet.

Similarities noticed were (1) higher free silica content at surface, (2) increasing amount of combined silica with depth (3) constancy of silica sesquioxide ratio within the profile. These similarities point to a similarity in the extent of influence of external factors like rainfall, temperature and topography. The formation of two soil types in close contiguity may, therefore, be due to differences in the mineral composition of the parent rock, and not to external features.

(iii) *Minerological Composition of soils:* As was done earlier by Harrison and Sivan, the minerals in the course fractions of

the soil were separated, employing heavy liquid separation technique, into 3 groups of specific gravities, (1) above 2·96, (2) Between 2·96 and 2·50 and (3) below 2·50. This was combined with a detailed minerological study of the rocks underlying the soils, for gathering information regarding the influence of the mineralogical composition of parent rock on that of the soil. Minerals present in each density group were identified by their petrological characteristics. Fusion analysis was performed with the different density groups.

Striking differences were observed between minerological composition of black soil high density group, which was found to contain amphibole and pyroxene groups, and that of the red soil high density group, which contained ilmenite, biotite, epidote and garnet.

These observations lend weight to the assumption that, in the Madras Deccan area, Black and Red soils have not evolved from the same kind of rocks. Black soils appear to have been derived from from rocks rich in amphiboles and pyroxenes, characterized by presence of large amounts of hornblende and plagioclase. Red soils, on the other hand, are derived from rocks containing mica and orthoclase felspar.

(iv) *Composition of clay minerals:* Clay colloids from the two types of soil were separated by differential sedimentation, and examined elaborately. Chemical analysis showed that silicate A (completely decomposed by HCl) was present in black soil colloids, while silicate B (resistant to HCl decomposition) was present in red soil colloids. Moreover, the silica-sesquioxide ratio of the black soil colloid was about 3, while the corresponding figure for the red soil colloid was only 2. This indicates that the predominant clay mineral of black soils is Montmorillonite and that of red soils, Kaolinite.

Thus, it was proved unequivocally that parent rock was the determining factor in the case of Madras Deccan soils. While Russian pedologists emphazised the influence of climate and environment in soil formation, the mass of useful soil data collected by Madras Agricultural Chemists indicated that the climatalogical theory of the Russians need not be accepted without modifications.

Irrigability of Black Soils of Madras Deccan: (1) GENERAL CONSIDERATIONS: The emphasis on the laboratory study of black and red soils outlined above should not lead one to suppose erroneously

that the practical aspect of the problem has been overlooked. The Tungabhadra Soil Survey is a monumental attempt at translating fundamental studies into practical applications.

It was the general local belief that black soils would not respond so well and so economically to irrigation as red soils. The object of the Tungabhadra Soil Survey was to verify this assumption, and to forecast and prevent, if possible, any evil effects attendant upon black soil irrigation. Fundamental work on these soils had established their general similarity to the Russian Chernozems, which had themselves been found suitable for irrigation. But, as the horizons, and the distribution of calcium carbonate and gypsum were different from those of the Chernozems, more detailed investigations seemed to be called for.

(2) CLASSIFICATION OF PROFILES ON BASIS OF DISTRIBUTION OF CALCIUM SALTS: Shiva Rau and Kasinathan (1951) paid attention to these differences between the Madras black soils and the chernozems and tried to determine the place of Madras Deccan black soils in a general system of classification. The Tungabhadra Soil Survey had revealed the existence of two obvious profiles, the gypseous and non-gypseous. A more detailed investigation brought out two main types of the gypseous profile itself. In one (Type I) gypsum was at the top, and calcium carbonate (or kankar) below, while in type II the relative positions of these calcium salts were reversed. This difference is indicative of a difference in the direction of eluviation.

Laboratory analysis for soluble salts showed that there was generally a higher concentration of soluble salts in layers near the surface in the case of type I. Moreover, it was observed that the two types were distributed over well-defined and significant areas, Type I, being absent in tracts under tank irrigation, while type II was present in such cases. These considerations hint at the difference in pedogenic factors for the two types.

(3) PROBABLE EFFECTS OF IRRIGATION ON SOILS, OF GYPSEOUS PROFILES: It could be reasonably inferred that the introduction of irrigation would, in the case of type II, accentuate the already existing natural trend, that is, of washing down of salts. On the otherhand, in type I the increased supply of water at the surface would result in a restoration of a typical chernozem process, or result in the concentration of alkali in the upper horizons, simulating conditions prevailing in brown steppe soils.

(4) STUDY OF CONDITIONS LIKELY TO PREVAIL ON INTRODUCTION OF IRRIGATION: The foregoing considerations indicate that the problem of irrigating Black soils of Madras Deccan is complicated, and that extreme caution is to be exercised in arriving at conclusions or offering recommendations. Therefore a detailed study of this problem was undertaken for gathering more exact information. This study consisted of two aspects: (a) complete analysis of soil samples drawn during soil survey (b) actual field experiments in a locality representative of the area. The former aspect is dealt with in the following pages. Emphasis was placed on the study of soil properties in relation to the effect of irrigation.

(a) *Mechanical Composition:* All four types of black soils (deep, shallow, with and without gypsum) were similar in containing more than 60% of fine fractions (Clay and silt) and in showing an increase in the fine fractions with depth. Further, gypseous layers possessed less of fine fractions.

(b) *Single value Constants:* Hygroscopic coefficient, maximum water-holding capacity, pore-space and absolute specific gravity, which represent single properties influenced by groups of other properties, were determined. Black soils were observed to have a moisture retaining power varying from 65–85%. Percolation and permeability were observed to be dependent upon clay content and presence of gypsum.

(c) *Total Soluble Salt Content:* This determination, which was one of the most important ones undertaken, revealed the fact that salt concentration increased up to the 4th or 5th foot, after which it began to decrease slightly. Ranges for the first three feet were (a) 0·1% (b) 0·1–0·3 and (c) 0·3–0·5% respectively, showing that at the root zone salt concentrations are well below toxic levels.

(d) *Nature of Soluble Salts:* It is well known that, more than the total soluble salt content, the quality of component salts is important in determining their effect on plants. Hilgrade and other American workers have set the limits of toxicity of sodium carbonate, sodium chloride and sodium sulphate, at 0·10%, 0·25% and 0·75% respectively.

Analytical data indicated that the limits set by Hilgrade were rarely exceeded; in the few cases where they were exceeded, the depth was well below that reached by roots of common crops.

In the gypseous profiles high concentration of salts was actually associated with the zone of gypsum concentration. Salts present at this zone were calcium and sodium sulphates, a little sodium chloride and magnesium salts, and traces of bicarbonates, carbonates being absent. In non-gypseous profiles, the gypsum was found replaced by sodium chloride, which, however, was well within toxic limits, or counter-balanced by calcium salts.

(e) *Exchangeable Bases:* The importance of exchangeable bases will be apparent when it is stated that they govern such diverse soil conditions as absorption and retention of moisture, availability of plant nutrients, formation of tilth, facility for good cultivation and range of possible crops. With the development of existing knowledge on mechanism of surface phenomena, the importance of base exchange on soil properties has gained prominence.

Thus, exchangeable calcium ions develop a crumb structure, enable a soil to be cultivated over a wide moisture range to make it possible for a number of crops to be raised. Sodium ions, on the other hand, deflocculate the soil, render it impervious to water and to plant-roots, and bring about soil deterioration to a degree unfit for crop growth.

Deep black soils with gypsum showed an average capacity of 45 to 60 milliequivalents, a figure indicating sufficiency of exchangeable bases, those without gypsum giving 45 to 65, shallow black soils with and without gypsum from 25 to 35, while red soils had capacities lower than 20. In other words, the black soils had a high base status, while the red ones had a low one.

Among the individual bases, the sum of exchangeable Calcium and Magnesium was fairly uniform throughout the profile, the exchangeable Calcium decreasing, and the exchangeable Magnesium increasing with depth, Sodium increased with depth, the increase being characteristic of the soil type examined.

(f) *Degree of Alkalization:* Puri and others, working on Punjab soils, have fixed 25% as the tolerated limit for degree of alkalization. The figures obtained for the project soil samples indicated that nearly three fourths had less than 20%, well within tolerated limits.

(g) *pH value:* This value is a measure of the intensity of soil reaction. Generally it is due to hydrolysable salts present, and

is closely associated with the degree of alkalization. Puri's observations on Punjab rice soils led him to conclude that pH values exceeding 8·5 decreased crop yields. In soils under Tungabhadra water irrigation, however, even at a pH of 9·5, the degree of alkalization was less than 25, and the yields were not affected. The reason for this difference in behaviour lies probably in the fact that Madras Deccan soils have a far higher lime status, which is responsible for increasing the pH, and, at the same, keeping down the degree of alkalization.

(h) *Examination of Soils from areas already under Irrigation:* The irrigated soils of the tract fall under three heads; black clays, loams, and sandy loams. The source of irrigation is either river or tank, the rivers being Tungabhabra and Pedda Hagari. More detailed information of the irrigability at the soils of the tract was sought from the chemical examination of soils from profile pits located in areas under irrigation.

The average total soluble salt content of Tungabhadra river waters was only 15 to 16 parts per 1,00,000, while for Pedda Hagari river and Chinna Hagari river the figures were 80 and 130 respectively. Water from the tanks of this area was also higher in salt content than the Tungabhadra. Moreover, Tungabhadra river water was free from carbonates, while the others and contained appreciable amounts of sodium and carbonates. This accounts for the fact that while wetland areas under Tungabhadra irrigation have maintained a high fertility status during the past several centuries, those under Hagari irrigation have already developed symptoms of alkalinity.

It is thus seen that the Black soils of Madras Deccan will give a very favourable reaction to irrigation with Tungabhadra water. The soil profile, with its gypseous and non-gypseous nature, the clayey condition of the soil which naturally impedes upward movement of salt solution, and above all, the high lime status and the low degree of alkalization are all points in favour of bringing the soils under irrigation. The only consideration is the quality of irrigation water, which must be free from carbonates and sodium. The Tungabhadra river water, with its low content of soluble salt, low sodium concentration and freedom from carbonate, ideally meets the situation.

Summary and Conclusions: A review of the work done by the Madras Agricultural Chemist's section on the colour, origin and properties of black and red soils, especially those of the Madras Deccan, is given. Enough data has been gathered and presented for assigning these soils a distinct place in the world group of soils. It has been pointed out that the Russian School of pedological thought is only of limited importance in the study of soil problems of the State. Results of elaborate analysis of different types of black soils and various sources of irrigation water have been presented, and their bearing on irrigability discussed in detail.

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Fusion of Fruits in Castor (*Ricinus Communis*, L.)

Abnormalities in castor fruits with two ovules (1) and multilocular (2) condition have been previously observed and recorded by the author. In the present note another case of capsule abnormality resulting from the fusion of fruits noted in the 1954–55 rainfed season crop at the Agricultural Research Station, Tindivanam is reported.

Fusion of fruits have been recorded in apple (3) and chillies (4). In chillies it has been improperly called as fasciation. True fasciation in the fruits of tomatoes has been recorded and discussed by Krishnamurthy (5). Fasciation possibly arises from changes occurring in a simple growth area of the plant but not due to the fusion of several organs.

In castor, the inflorscence is an erect terminal branched raceme of cymes with staminate flowers at the lower portion of the flowering axis and the pestillate flowers towards the top (6). The ovaries are three carpelled with three styles. The fruit is a schizorcarp dividing into three cocci each having a single seed. Normally each capsule is attached to the rachis by means of pedicel or stalk. The stalks are short in some cases and in certain others long. Among the 'stalked' capsules there are forms in which the stalks of capsules are either branched or non-branched. Stalks, branched and non-branched occurring in one and the same inflorescence are not uncommon. The fruit-stalk in either case, bears the single tricarpellary schizocarpic fruit at the tip. But in the cases recorded here two and three fruits are found fused together at the tip of single stalk. In contrast to the rounded nature met with in normal pedicel, the frult stalk is flattened with distinct grooves, indicating the fusion having taken place quite early from the flowering stage itself (Figures 1, 2 and 3). The fused fruits have carpels ranging from six to nine bringing out the fusion of two or three ovaries. This character was not found heritable on study.

(1) Normal capsule, (2) Two capsules fused, (3) Three capsules fused.

In one case (Fig. 2) actually seven carpels with seven seeds were noted. Of these six carpels and six seeds were normal while the seventh one was diminutive in size, corresponding to the multilocular or multicarpellary fruits, already recorded (2).

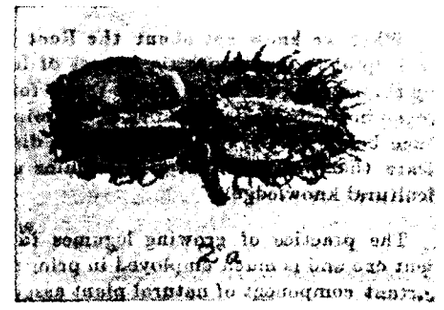

Fig. 2-a. Two capsules fused

It is of interest to note, that such fused fruits as recorded here, were observed rather frequently in typesor varieties wherein the inflorescence bears big compactly set capsules. The causes for the fusion are not exactly known.

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Reviews

What we know not about the Root Nodules of Leguminous Plants: It is often helpful to emphasise the aspect of how much we have yet to know about many things that are more or less taken for granted. The fixation of atmospheric nitrogen in the bacterial nodules of leguminous plants is an example. An attempt is made below by Dr. H. G. Thornton, a distinguished worker in microbiology, to indicate the vast field that still remains unclarified in this important branch of agricultural knowledge.

The practice of growing legumes in association with other plants is an ancient one and is much employed in primitive agriculture. Legumes comprise an important component of natural plant associations, where the nitrogen compounds formed in their nodules help to maintain the fertility of virgin soil. The amounts of nitrogen taken from the air by various leguminous crops under field conditions have been estimated by various workers and found to average about 100 pounds per acre annually. A considerable portion of the combined nitrogen is left in the soil and the soil enrichment thus produced may often last for several years.

Geologically it seems likely that the evolution and spread of nodule-bearing legumes played a vital part in the Tertiary times. The spread of legumes and the consequent improvement in soil fertility and the feeding value of the vegetation may well have contributed to the rapid evolution of mammals in the earlier Tertiary period.

The nodule bacteria are placed in a special genus *Rhizobium* in a systematic portion close to *B. radiobacter*. The morphology of the nodule bacteria is complicated by the frequency with which changes occur in cell shapes. In old cultures the majority of cells consist of small cocci; a fresh supply of suitable energy material causes these Cocci to swell and become actively motile. Apart from this, striking deviations are also met with in cell shapes, but more work is needed before such cell shape variations can be established as normal components of the life history.

The life-cycle of the organism has a bearing on the spread of the bacteria through the soil and on the infection of the host plant. At Rothamsted, the rate of spread was determined to be about 1 inch in 24 hours.

Small amounts of calcium dihydrogen phosphate added to the soil along with the bacteria accelerates the appearance of the flagellated "Swarming" stage and hastens the spread of bacteria in the soil. In fact this method of hastening the spread of the bacteria through the soil now forms part of the process of seed "inoculation" for legumes.

What is still obscure is the effect of the physical conditions of the soil, temperature and moisture upon the migration of the bacteria. These offer a promissing field for investigation.

Lime exerts a benefical effect upon these nodule bacteria and the form in which the calcium is present is also very important. Calcium absorbed on clay was especially benefical, though the reason for this is still obscure.

The nodule bacteria make little growth, if supplied with synthetic nutrients such as mineral salts and pure sugar, but require a stimulatory substance which can be obtained from legume roots, yeasts or from molasses. The first appearance of nodules occurs at the time when the first true leaf unfolds in the host legumes.

The solution surrounding the roots at this stage contains a root secretion which stimulates the multiplication of the bacteria but neither its nature nor the seat of its formation within the plant is known.

The nodule bacteria are divisible into groups, nowadays raised to the rank of species, each of which are able to infect only a limited number of host legumes. Due to this specificity of nodule bacteria, a legume crop cannot be introduced into a new district, unless the nodule organisms are also introduced into a soil, by a process known as seed inoculation.

The reason for such a specificity are not known and would repay investigation. The cause of the cell division, resulting in the formation and growth of the 'nodule' and how far the penetration by bacteria should proceed before the primary endodermis and stelar tissues are stimulated into producing nodules, are still not clear.

The method by which the bacteria are distributed through the cells of the young nodule differs in different legumes. Three main types can be distinguished; the commonest is for the bacteria to spread by means of "infection threads" which pass through the cell walls, in a second type, the bacteria infect the intercellular spaces and spread by that means. A third type is found in Lupins; here the bacteria invade meristematic cells of the young nodule itself and are carried to the poles of the mitotic spindles and thereby get distributed to the daughter-cells.

The nodules differ in many respects from bacterial roots and in particular the central mass of cells, which are densely populated with bacteria, is conveniently called the "bacterial tissue". No better instance of our ignorance can be given than this, that we are obliged to say that this "bacterial tissue" is *presumed* to be the seat of nitrogen fixation.

In spite of the fact that this subject has been studied now for nearly sixty-five years, very little progress has been made on how nitrogen is fixed inside the nodules. There is little doubt that the process is dependent on the active production of carbohydrate in the leaves; it can be stimulated by increasing the carbon dioxide supply and is checked by darkening the plant, but the nitrogen utilised by the nodules is absorbed only from the soil atmosphere and is not carried down from the leaves. Why this should be so is not known. It is also not known, what the primary product of this nitrogen fixation is. Nitrates and ammonium salts are not found in nodule bearing legumes, unless derived from the root surroundings. There is some indirect evidence that aspartic acid and lysine are among the earliest products of nitrogen fixation, but great caution is needed in distinguishing between the primary products of nitrogen fixation and the later products of metabolism.

There is also disagreement as to the method by which nitrogen compounds produced by the nodule bacteria are transferred to the host plant. A similar doubt also exists about the mode of transfer of nitrogen compounds from the legume-root system into the soil. It was formerly believed that it was effected by root decay of the host legumes, but recently it has been shown that nitrogen compounds appear outside the legume root-system, while the latter is still in the early stage of growth and before any visible root decay has taken place.

The compounds derived from nitrogen fixation by leguminous plants in their root nodule are taken up by non-legumes growing in association with the legumes, an interesting case of double symbiosis.

Infection of the roots of the host legume by nodule bacteria, the subsequent formation of the nodules and the proper functioning of the bacteria within them,

all depend upon a delicate physiological equilibrium. Infection can be completely arrested by 0·05 per cent of sodium nitrate in the solution surrounding the roots, but this can be counteracted by the simultaneous supply of sugar to the roots; thus the infection is apparently related with the carbohydrate-nitrogen balance in the root-hairs.

Under certain conditions, especially when a nutrient element like boron is deficient, the nodule bacteria actually turn upon the host plant and become parasitic upon them. Similar parasitism is produced, when the carbohydrate supply is made insufficient, by etiolation of the plants. A wide range of intrinsic differences also exist between strains of nodule bacteria and it is not yet understood why some strains fail to confer the benefits of nitrogen fixation upon the host legumes.

Individual strains also change in their effectiveness, either increasing or decreasing, without any evident relation to the conditions of growth of the host legumes. Another lacuna in our knowledge is the geographical variation in the distribution of benefical and non-beneficial strains of nodule bacteria. In some cases, an inefficient strain in addition to being itself useless to the host, indirectly harms the host plant, by preventing the entry of useful strains. It is uncertain whether this strain competition takes place outside the plant or inside, whereby the presence of nodules containing one strain may confer an immunity against other strains of bacteria.

The above outline of our knowledge of the nodule bacteria and their associations with the host legume is intended to emphasise how great and important are the gaps in our knowledge-gaps which occur at the critical point in almost every line of investigation. The nodules on legumes afford problems, whose solution would illuminate much wider fields in biology; such as those of bacterial genetics, growth-promoting substances, and the formation of pathological growths. The great mystery of biological nitrogen-fixation itself remains unsolved.

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Gleanings

Fibre From Sesbania: It is a well known fact that Sesbania speciosa is a good leguminous green manure plant suitable for growing as a pure crop on a field scale during summer months in rice follows, and for application to paddy fields as green manure. It can also be grown along field margins in transplanted fields for obtaining green manure for the succeeding crop of paddy and also for the production of seed. In order to find out whether fibre can be extracted from Sesbania plants just like in sunnhemp, trails were conducted at Agricultural Research Station, Aduthurai and fibre extracted. The following note gives the particulars of extraction of fibre. Sesbania was raised as a pure crop by sowing seeds broadcast on 3—9—1954 at the rate of 50 lb. per acre in a ploughed and prepared wet land field. From the crop that came up, plants were cut at three different stages of growth namely, (1) just before flowering, (2) while in flowers and (3) after ripe pods were collected. Five hundred plants in each stage were cut at the ground level, dried completely and after removal of all the leaves, the stems, alone were retained and they were divided into 10 lots of 50 each and put

in water for retting. After 10 days of retting in the first two cases and after 15 days of retting in the last case, the stems were beaten in water and the fibre removed from them. From the fibre thus extracted, plough ropes, neck ropes and head ropes for animals were made and put to use on the farm. The ropes made out of Susbania fibre are found to compare favourably with coir ropes. The data collected on the above trial are furnished below:—

	Just before flowering 11—12—1954	While flowering 12—1—1955	After seeds are collected 4—4—1955
Date of extraction			
Weight of fibre got from 500 plants	3 lb. 10 oz.	6 lb. 1 oz.	6 lb. 3 oz.
Acre yield of fibre	2,273 lb.	3,804 lb.	3,880 lb.
Quality of fibre	Fine and lustrous	Coarse and dull white	Very coarse and dull white
Cost of production of one lb. of fibre	Rs. 0—2—3 10	Rs. 0—1—6 10	Rs. 0—1—0 15
No. of days taken for retting			

(D. A's. Agri. Newsletter, 1955) [A. M. K.]

Better Feeding value obtained: Treatment of Paddy Straw: Extensive experiments have shown that washing paddy straw in water offers a simple and practical method of increasing the feeding value of the straw and removing some harmful substances contained in it. Straw is first cut into pieces of convenient size and soaked in water in an earthern pot for 24 hours. It is then washed in clean water, dried and stored. The water in which straw has been washed should not be used over again, but in case water is scarce, the same water can be used over again after adding 0·05 per cent lime to it. (ICAR.—Farm News Release No. 68.)

Storing *Gur*: Use of Ash gives good results: Research conducted at the Sugarcane Research Station, Pusa (Bihar), has shown that an effective and cheap method of storing *gur* is to keep it in a thick covering of furnace ash. *Gur* thus stored remains in perfect condition, maintaining its hardness, texture, taste and colour. Since *gur* stored in this manner remains dry, the ash can be easily dusted off with a piece of cloth. Further, if the *gur* is wrapped up in gunny sacking prior to being embedded in ash, it does not lose in weight even slightly, and there will be no need to clean the surface of the *gur* before use.

(ICAR.—Farm News Release No. 69.)

Red Rot of Cane: Some Steps that Help in Control: A careful examination of sugarcane setts before planting helps to keep down red rot. Cane should be taken from plots specially raised and from where diseased clumps have been removed and destroyed, as a first step towards raising a disease-free crop. Before planting, the cut ends of the cane should be examined, and those showing even a trace of reddening should be rejected. The field in which cane is planted should also be free of red rot infection. To ensure this, agricultural experts recommend that all trash and cane stubbles of the previous crop should be carefully removed, and a rotation followed in which cane is not grown for two years subsequent to any serious red rot infection. If some canes are still found infected with the disease, the entire clumps containing the diseased canes should be removed and burnt. If infection is heavy and occurs early, then the field should be ploughed up and the setts and stubbles burnt. The field should be either kept fallow or sown with some other crop. If, however, infection comes late in the season, the crop should be cut and crushed as early as possible. In both the cases, the field should not be planted with cane for some time. (ICAR.—Farm News Release No. 70.)

Rice Borer Damage: Some Ways Towards Control: Losses to the tune of Rupees ten crores are caused annually to the rice crop in India by a single pest—the stem borer. The pest bores into the stem of the rice plant causing the

central shoot to wither and form a 'dead heart'. White ears in the plants are an indication of the damage by this pest. Though no effective method of control of the pest is yet known, agricultural experts recommend the ploughing of the field after rice harvest, collecting and burning the stubbles and keeping the bunds free of grasses in which the insect hides in the off-season, as measures which reduce the damage from the pest. Dusting the crop with four to five per cent BHC at 12 to 15 pounds per acre gives good results. (ICAR.—Farm News Release No. 72.)

Artificial Fertilizers: Precautions in Application: When applying fertilizers to crops, farmers should ensure that there is enough moisture in the soil. There should be sufficient organic matter also in the soil, as otherwise beneficial results are not obtained from the use of fertilizers. When a fertilizer containing nitrogen is to be applied as a top-dressing to a standing crop, it should be mixed with five parts of soil or farmyard manure, so that the fertilizer is diluted and does not burn the leaves on which it may drop. Top-dressing with nitrogenous fertilizers is best done after one or two weeks of the germination of the crop or the establishment of a transplanted crop. Large doses of nitrogenous fertilizers should not be applied to sandy or gravelly soils. (ICAR.—Farm News Release No. 75.)

Molasses grass (Melinis minutiflora Beauv) was introduced to Queensland some 40–50 years ago from tropical South America. The grass is a native of Africa and is now widely spread in tropical areas throughout the world. Molasses grass is a perennial tufted grass of straggling habit, each crown producing a large number of trailing stems up to six feet long and reaching a height of two feet or more. With care in management will readily control aggressive tropical weed growth. Molasses grass has a strong and distinctive smell, due to the presence in the leaf of a volatile oil. In addition, the leaves exude a sticky secretion. In Queensland the grass has shown considerable drought resistance. However, it makes its most vigorous growth on the west tropical coastal areas with good drainage. Molasses grass will tolerate acid soils but will not grow successfully on areas subject to seasonal high water table levels or on areas subject to periodic flooding.

(Queensland Agri. J., Vol. 80, p. 129, 1955.) [N. V. S.]

Mango-Hopper Trouble: Effective Check with DDT: Growers sometimes find their mango flowering profusely, but failing to set fruit. In many cases, this is due to the mango flowers getting infested with a pest known as mango-hoppers which damage them. This damage can be prevented by spraying DDT (0·16 to 0·25 per cent). Spraying should be done as soon as the bunches of flowers make their appearance in the beginning of the spring season. DDT emulsion or wettable DDT (Guesarol 550) also can be used in the same strength.

—ICAR Form News Release No. 53.

Harvesting Sugarcane Gur: Cutting Close to the Ground Advised: After sugarcane is harvested, it begins to lose in weight due to evaporation of moisture. It also loses a part of its crystalline sugar. Farmers are, therefore, advised to crush the cane for *gur* manufacture soon after it is harvested, preferably within 24 hours of cutting. While harvesting, the cane should be cut as close to the ground as possible, as the lowermost portion of the cane is the richest in sugar. Topping should be done just above the highest coloured joint. For gurmaking, however, it is better to remove the top two or three joints.

—ICAR Farm News Release No. 54.

Ammonium Sulphate for Vegetables: Time of Application: Vegetables are benefited if they are given quick acting nitrogenous fertilizers, like ammonium sulphate, once or twice as top dressing. The fertilizer should be applied near the roots, and it should not be allowed to come in direct contact with the leaves. A handful of ammonium sulphate is generally found sufficient for about a square

yard of the vegetable plot. The fertilizer should be well mixed in the soil by a light hoeing and the land irrigated immediately thereafter. The right time for top dressing is when the plants are well established and their growth is rapid. A second top dressing can also be given a little before plants start flowering. At these two periods, the food requirement of the plants is generally high, and the fertilizers will meet this demand. —ICAR Farm News Release No. 56.

Fly-Breeding in Compost; Control by Fire Treatment: Wherever compost or farmyard manure is made in pits or heaps, fly breeding is one problem that is met with. When compost is made in the vicinity of towns, this becomes a serious problem for health authorities to tackle. Experiments have shown an easy way out of this problem. All dry rags from refuse carts should be collected and spread over the pit area along with some dry refuse on the fifth day after filling the pits. These are then set to smouldering fire, which destroys all pupae of the flies which lodge in the surface layer. The operation, if repeated on the tenth day, ensures that all fly pupae that might have subsequently come up are also destroyed. Instead of rags, other materials like paddy husk, wheat straw and sawdust may also be used. Compost manure in heaps can also be similarly treated. —ICAR Farm News Release No. 57.

Irrigating Vegetables: Simple Rules to Follow: Farmers sometimes tend to over-irrigate their vegetable crops. This has been found to lead to diseases like 'damping off'. Thick sowing of seeds in a nursery also results in similar diseases. Though there can be no hard and fast rule about the frequency of irrigation, water should normally be given when the upper layer of soil shows signs of drying up. Irrigation should be deep so that the water soaks down to the root level. A shallow irrigation which leaves the root zone dry is of no value.

—ICAR Farm News Release No. 60.

Placing Fertilizers for Crops: Simple and Cheap Device: A cheap and simple device has been evolved at the Indian Agricultural Research Institute, New Delhi, for 'placing' fertilizers at proper depths for crops. Placement of fertilizers has distinct advantages over the usual method of broadcasting. This way, not only economy is effected in the fertilizers, but they are better utilized by the plants. The device for placing fertilizers consists of *paras*, which are metal or wooden tubes with a funnel attached to the top and clamped to the commonly used horse hoe. The lower end of the *para* is bolted on to a thin iron plate bent to the shape of a *U*. With such a device, not only can seed be drilled with the fertilizers, but the width and depth can also be adjusted. The device can be prepared in villages and will cost about Rs. 15.—ICAR Farm News Release No. 61.

Feeding Animals with Legumes: Bloating can be Avoided: Legume fodders are rich in proteins, but they are liable to cause bloating in animals, especially in the earlier stages of growth, the degree of bloating depending upon the kind of legume fed. Experiments show that this effect can be avoided if the quantity of legume fodder does not exceed 30 per cent of the total fodder given to an animal. When berseem is the fodder used, it should be mixed with three times its weight of *bhusa* and fed. The proportion of berseem may be gradually raised so that later the animal may be completely fed on berseem alone. In case of bloating, a pound of linseed oil containing a couple of ounces of turpentine oil may be administered to the animal. —ICAR Farm News Release No. 62.

Better Legume Growth: Treatment of Seed with Cultures: Research work at the Indian Agricultural Research Institute, New Delhi, has shown that legumes like berseem, sannhemp and *dhaincha*, which do not ordinarily make good growth, would do so if the seeds of these legumes are treated with bacterial

cultures suitable to each crop. For the growth and high yields of legume crops, it is necessary for the soil to have certain types of bacteria. Where these bacteria are not found in sufficient numbers, the legume crops make poor growth. The Agricultural Research Institutes at New District Coimbatore supplies bacteria cultures suitable for treating different legume seeds to a large number of farmers every year. —ICAR Farm News Release No. 66.

Skin Colour in Sweet Potatoes: Not Related to Internal Qualities: Does the skin colour of the sweet potato indicate its other qualities? Recent work at the Indian Agricultural Research Institute, New Delhi, has shown that the colour of the skin of the sweet potato has no connection with sweetness or any other quality found in a good table variety. Most cultivated varieties of sweet potato have white or red skins. Some have brownish colour too. In North India, farmers prefer red varieties to white, while in the South, the opposite is the case. —ICAR Farm News Release No. 64.

Heat Treating of Eggs: Prolongs Storage Period: Experiments conducted at the Indian Veterinary Research Institute have shown that heating eggs in water at 130°F (melting temperature of candle wax) for 15 to 20 minutes, prevents them from being spoiled during the summer months. It is during these months that egg spoilage is the greatest. The heat treatment kills the embryo in the fertile egg and thus improves its keeping quality. Heat-treated eggs kept at room temperature during May for fourteen days were found edible and almost as good as fresh. —ICAR Farm News Release No. 65.

Rice Grasshopper: Ploughing and Dusting Recommended: Deep ploughing of field and especially scraping of the gentle slopes of the bunds, have been found to destroy a large proportion of the eggs of the rice grasshopper which damages the rice crop. The grasshopper, in some years, does serious damage to the rice crop. The pest, both in the young and grown up stages, eats away the tender leaves of the plants and even the tender grains in the ear. Dusting the hoppers with five per cent BHC at the rate of 10 to 20 pounds per acre, according to the degree of infestation, gives good results. Dusting should also be done on the grasses on the bunds to kill as many young hoppers as possible. The local Agricultural Department should be consulted for further details regarding the control of this pest. —ICAR Farm News Release No. 67.

Reinforcing the Sevak Agricultural Information 'Workshop' in Simla: An agricultural information 'Workshop', that will open up new ways of reinforcing the village level worker in Himachal Pradesh, was inaugurated on June 6 in Simla. Main emphasis in the Workshop is on the production of educational materials like phamphlets, folders, booklets and posters and visual aids that will help make village level worker a better extension teacher. The materials are based on manuscripts prepared by Himachal Pradesh Specialists on soils, vegetable crops, fruit production and other subjects important in that State. They will be prepared by a team of Himachal Pradesh and I.C.A.R. Information Officers and Artists. The materials will be reproduced on an offset printing press maintained by the Himachal Pradesh Department of Agriculture. The basic idea behind the Workshop is to increase the flow of knowledge from laboratories and experimental fields to the farmers of the State. Director of Agriculture Dr. Pushker Nath, feels that this can be done by providing village level workers with improved teaching materials and by keeping them better informed on the results of research. This will be the second State in the Indian Union to have an Agricultural Information Workshops. The first one was held recently in Madhya Pradesh which produced educational materials for the Gram Sevaks of the State. The third workshop is scheduled in Bihar from July 18 to 29 and similar sessions are planned in other States in the year. The Workshops represent a co-operative effort of the individual State, the Indian Council of Agricultural Research and the United States Technical Co-operation Mission.

(ICAR Farm News Release No. 67 A.)

Manganese Deficiency in Vegetable Crops: *Manganese in the Soil:* Plants require very small quantities of manganese, which exists in soils combined with other elements to form several different kinds of manganese compounds. Plants normally get all the manganese they need from such compounds, but they can extract it more easily from some compounds than from others, and also more readily from the smaller manganese-containing soil particles. Thus the form in which the manganese is present in the soil is important since this determines how effectively plants can use it. A manganese-deficient soil does not contain enough available manganese for plants to make healthy growth. Certain soil conditions, such as the reaction (i. e., the degree of acidity or alkalinity), the amount of organic matter, and drainage determine the nature of the manganese compounds in the soil. An acid soil reaction favours the presence of the available forms of manganese, hence manganese-deficiency disease is rarely encountered in plants grown in strongly acid soils. However, liming by making the soil less acid, causes the manganese to be less available and sometimes makes acid sandy soils, which may contain small total amounts of manganese, manganese-deficient. Some naturally alkaline soils are deficient also, but the majority contain ample quantities of available manganese. Organic matter tends to reduce the availability of manganese, and it is noticeable that some acid soils well supplied with organic matter are particularly liable to become deficient after they have been limed. Waterlogging of the soil usually causes some of the insoluble manganese compounds to become soluble and, provided the waterlogging is only temporary, the amount of available manganese in the soil may be increased. But much soluble manganese may be washed out if the waterlogging is prolonged, consequently some badly-drained soils are manganese-deficient.

Symptoms of Manganese Deficiency: Manganese is concerned with the formation of chlorophyll – the green leaf pigment – and when manganese is deficient, the leaves of affected plants develop a characteristic yellow or pale-green mottling between the veins. Sometimes small brown spots develop in the mottled areas. Thus, manganese deficiency often can be recognized by visual symptoms which appear on the leaves of affected plants. Symptom are as follows :

Cabbage, Brussels Sprouts, Cauliflower: The symptoms first appear as yellow and light-green patches between the veins, the veins themselves remaining green. When the deficiency is severe, the plants have a bleached appearance and only the veins are green. Sometimes, in particular with the Savoy cabbage variety, the tissue between the veins may develop a dull, brownish-grey colour. When the deficiency is acute, the plants may be stunted and may not form hearts of sprouts.

Red Beet: The symptoms in red beet crops are striking. The leaves tend to grow upright and are triangular in shape due to the curling up of the lower edges of the leaves. The leaves first develop yellow mottling between the veins, but later production of red pigment gives the leaves a faded red colour. Brownish areas may develop between the veins, and sometimes the brown tissue dies and falls out, leaving small holes. A manganese-deficient red beet crop has a characteristic reddish colour, compared with the green appearance of a healthy crop. The roots appear to develop normally, but there is a reduction in the yield of the crop, while the unattractive appearance of the leaves makes the crop unsuitable for "bunching" for market.

Peas: Affected peas show a small brown speck or a larger circular brown area in the centre of the mature pea seed, a condition commonly known as "Marsh

Spot". The plant itself on which affected peas have been found may appear healthy. However, where the condition is severe, the leaves may develop mottling between the veins.

French Beans: The leaves of French beans develop a strong yellow mottling between the veins, and the yellow areas may later develop small brown areas. A condition similar to "Marsh Spot" of peas may appear in the seeds.

Parsnips, Marrows, and Cucumbers: The leaves of parsnips, marrows, and cucumbers develop a well-marked yellow mottling between the veins, while the veins themselves remain green.

Tomatoes: Leaf symptoms appear in tomatoes only when the deficiency is acute. Yellow or pale-green mottling occurs on the younger leaves and this may spread to the older leaves, giving the whole plant a very pale-green appearance. Brown areas which may die and fall out may appear later in the mottled areas.

Methods of Control: Growers who observe plant symptoms suggesting manganese deficiency are advised to confirm the diagnosis by taking a soil sample for a reaction tests, and by asking the soil chemist and vegetable specialist to examine the affected crop.

Careful Use of Lime: Cautious use of lime is essential on the sandy soils to prevent these soils from becoming manganese deficient. Agricultural ground limestone is to be preferred for use on sandy soils to the burnt or slaked limes which tend to cause more violent changes in soil reaction.

Sulphur: Sulphur acts by making the soil more acid, so helping the plant to obtain the necessary manganese from the natural supplies in the soil. However, large quantities of sulphur may be required to reduce the reaction of heavily-limed soils sufficiently. Applications of 10 cwt. of sulphur per acre to a sandy clay loam soil of pH 6·5 have proved successful in curing manganese deficiency, but, although the method effects a permanent cure, it is not as economical as either plant or soil applications of manganese sulphate.

Sulphate of Ammonia: Ammonium sulphate also increased the acidity of the soil and is commonly used in the normal fertilizer programme. Consequently, the reaction of manganese-deficient soils will fall gradually, provided no further lime is applied, but it may take many years for the reaction to fall below pH 6·3 if the soil has been heavily limed.

Spray Application of Manganese Sulphate: Spraying the foliage with manganese sulphate is the most economical method of correcting manganese deficiency and also gives a quicker response than soil application. Affected crops may be sprayed an any stage of growth, but it is obviously an advantage if deficiency symptoms can be detected and treated at an early stage. Sprays of from 0·26 to 1·0 per cent. of manganese sulphate may be used according to the severity of the disease. Prepare by dissolving 2½ to 10 lb. of manganese sulphate in 100 gallons of water and apply this quantity per acre. One per cent. sprays have been used without causing any burning to cabbage, Brussels sprouts, and red beet crops. In cases of acute deficiency, two 1 per cent sprays applied at a fortnightly interval, each at a rate of 100 gallons per acre, may be necessary to cure the deficiency, particularly in red beet crops.

Manganese Sulphate Applied to the Soil: Soil application has its greatest value when manganese-deficient land is being prepared for susceptible crops. A dressing of 60 to 100 lb. of manganese sulphate per acre may be broadcast prior to the final ploughing of the soil. If deficiency symptoms are detected in the vege. table crops at a sufficiently early stage of growth, manganese sulphate applied to the soil will arrest the disease. It is best to apply the manganese as a banded side-dressing between the rows not too close to the plant stems. The dressing should then be worked well into the soil in a position where it is accessible to the roots of the plants.

Danger of Manganese Poisoning: Too much available manganese in the soil is poisonous to plants and can also aggravate disorders associated with molybdenum deficiency. On deficient soils of higher reaction, the present recommendation is that manganese should be applied with each susceptible crop, but it would be wise to limit the total manganese sulphate applied on any one area to 2000 lb. per acre, particularly where efforts are being made to reduce the soil reaction by ceasing to apply lime.

(Australian Agri. News letter No. AGN/474)

Storing Gur: An Economic Method: Experiments in Uttar Pradesh show that a metal container of four to five maunds capacity with a lid having a rubber packing is the best for storing *gur*. A little lime is placed in the container to keep the air inside dry. *Gur* stored in this way occupies comparatively less space and makes transport easy. The stored product, because of its good condition, will also fetch a higher price in the market. As such containers last a long time, the overall cost of storage will also be low. —ICAR Farm News Release No. 83.

Clump Rot of Cardamom: Lime Checks Attack: Clump rot is a common disease of cardamom, usually recognised by the plain and yellowing of leaves. Diseased clumps are conspicuous by fallen leafy shoots. The trouble, as such, is often decribed as "falling off". Experiments show that applying lime at three ounces per clump in the affected plantation arrests the disease. Application of ammonium sulphate or superphosphate at three ounces per clump a month or two later is also found to stimulate the fresh growth of shoots and helps the clumps to revive quickly. —ICAR Farm News Release No. 84.

A Good Ram: Physicial Characteristics: Certain physical points indicate a ram to be suitable for heading your flock, experience points out. A good ram is muscular, vigorous and strong. Legs are short, with good bone and feet. The chest is broad and deep. The brisket or the region below the neck and between the forelimbs is wide and fleshy. The lions are abroad, and quarters thick and full. Flesh is firm and thick. A strong head and a heavy neck indicate it has musculine looks. The sex organs are well-developed. Rams of a wooly breed should, in addition, have a dense fleece of a good quality. Sheep breeders are advised to avoid rams with one of the lips protruding beyond the other, or those with week legs, or those with one testicle. —ICAR Farm News Release No. 85.

Dehydrating Potatoes: The preservation of potatoes by drying is at least 2,000 years old, but the process usually had an adverse effect on their taste and colour. Now, improved methods of dehydration can preserve potatoes so that they retain their original flavour and appearance. Under new processes developed by the U. S. Department of Agriculture dehydrated potatoes will be marketed as flakes and granules from which mashed potatoes can be made, and as potato puffs and potato-chip bars. Commercial production will begin as soon as equipment and processes which have already passed department tests are fitted to large-scale industrial production.

[Extract from COMMERCE dated 28—5—1955. (p. 1029.)]

Abstract

The Hazards of DDT-Treatment of Potatoes: Pingale et al showed that DDT was persistent on potato tubers and even after washing and boiling, carried a contamination of 12·5 p. p. m. When fed to laboratory rats, these tubers brought about disorders of the liver.

It was found from the analysis of Mysore potato tubers sold in the market that the contamination of DDT was 151·8 + 3·1 p. p. m., ranging from 134–169 p. p. m. A left over residue of 56·3 p. p. m. of DDT was reduced to 12·5 p. p. m. on washing and boiling the tubers. According to the unofficial opinion in the U. K. the limit of DDT in foods is 7·0 p. p. m. It is warned to limit the use of DDT as insecticide on potatoes used for consumption which will give a residue over the lower limit found to be harmless. (Bull Central Food Tech. Res. Inst. Mysore, December 1954) [N. V. S.]

Carrots and Coconut Milk: Tiny isolated bits of carrot root, cut as nearly identically as possible from a position about one tenth of an inch from the cambial ring. In the best combinations of knownn utrients, these bits of carrot grew little, or not at all, but in a medium supplemented with coconut milk they grew apace The carrot bits are rotated in specially designed tubes so that the pieces are alternately submerged and exposed to air. In media supplemented with the coconut milk, the carrot explants grow very rapidly, increasing from about the size of a pinhead to as large as a pea in 3 weeks. But the most interesting feature is that this growth is mainly by cell division 25,000 cells increase to more than a million in 8–10 days. About 1,000 cultures are commonly grown simultaneously in a temperature regulated room. The biochemical work is now being done in association with a member of the Sloan-Kettering Institute for cancer Research, and the Research has been aided throughout by grants from the National cancer Institute of the Institutes of Health.

The active substances are distinct from any known vitamins or growth regulators. They are present in coconut milk in very minute amount and are effective in very dilute solution (1 or 2 parts in a million of water). After some some hundreds of such experiments, it is known that 4 or 5 distinct active substances occur in coconut milk. These are obtainable in crystalline form to determine their nature and chemical constitution. (M. V. Sharangapani and S. V. Pingele Florida Gardener, March, 1955.) [N.V. S.]

News and Notes

The Budget meeting of the Madras Agricultural College Students' Club was held at 5-30 P. M. on 7—6—1955 with Mr. R. Balasubramaniam, Principal and the President of the Students' Club in the chair. After the discussions regarding the items of expenditure, the budget was moved and the various journals of the Club were auctioned.

The inaugural meeting of the Students' Club was held on 24th June 1955 at 5-30 P. M. Mr. D. Daniel Sundararaj, Lecturer in Botany presided over the function while Mr. N. L. Dutt, the Director of the Sugarcane Breeding Institute, delivered the inaugural address.

The inaugural address of the Debating Society was delivered by Mr. Nazareth, Additional Sessions Judge on 25th June 1955 at 5-30 P. M. in the Freeman Hall. Mr. K. P. Aananthanarayanan, Government Entomologist, presided over the function.

A debate was held under the auspicious of debating society on 27th July 1955 with Dr. M. Srinivasan as the President. The subject for the debate was "Mother tongue must be the medium of instruction for University courses". A pannel of judges consisting of Dr. M. Srinivasan. Mr. Stanley Gansalves and Mr. C. K. Rajagopalan. The house voted against the motion.

Weather Review — For the month of June, 1955.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January	Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam)	2·3	+ 0·4	15·1	South	Madurai	0·5	— 1·0	8·6
	Tirurkuppam*	1·7	— 0·5	14·3		Pamban	0·0	— 0·1	13·7
	Vellore	1·6	— 1·2	11·7		Koilpatti*	1·0	+ 0·8	9·7
	Gudiyatham*	4·0	+ 1·1	10·4		Palayamcottai	0·2	— 0·2	9·5
East Coast	Palur*	1·6	— 0·2	23·9		Ambasamudram*	1·5	+ 0·2	15·5
	Tindivanam*	2·0	+ 1·0	11·6	West Coast	Trivandrum	11·9	— 1·3	35·0
	Cuddalore	1·3	— 0·1	22·1		Fort Cochin	39·8	+11·4	76·9
	Nagapattinam	0·7	— 0 6	14·6		Pattambi*	28·2	+ 0·3	50·6
	Aduturai*	1·1	+ 0·2	16·6		Kozhikode	39·4	+ 6·3	75·8
	Pattukottai*	1·0	+ 0·2	9·2		Taliparamba*	33·8	— 1·1	65·4
Central	Salem	0·5	— 2·6	11·6		Wynaad*	15 8	+ 2·4	42·3
	Coimbatore (A. M. O.)*	1·7	+ 0·4	9·7		Nileshwar*	51·7	+ 9·1	84·4
	Coimbatore	1·1	— 0·5	12·2		Pilicode*	33·8	— 6·4	68·7
	Tiruchirapalli	1·4	— 0·2	12·2		Mangalore	49·3	+12·2	64·9
						Kankanady*	51·2	+11·4	67·1
					Hills	Kodaikanal	4·6	+ 0·3	32·4
						Coonoor*	1·3	— 0·8	17·8
						Ootacamund*	7·3	+ 2·3	35·2
						Nanjanad*	12·8	+ 5·3	35·2

Note:— * Meteorological Stations of the Madras Agric. Dept.

During the commencement of the month a trough of low pressure existed off the Kanara coast. This extended northwards and concentrated into a depression, with its central region about 150 miles south-west of Veraval on 4—6—1955, but began to weaken on the very next day and passed away north-west-wards and became unimportant on 6—6—1955, causing considerable weakening of the monsoon along the West Coast. During this period markedly unsettled conditions were observed in the east central Bay of Bengal on 4—6—1955, but they became unimportant on the very next day, under the influence of an easterly wave moving across Indo-China. The easterly wave emerged into the east Central Bay of Bengal on 7—6—1955, causing unsettled conditions, which moved west-wards and became less marked off the Orissa-Circars coast on 10—6—1955. The axis of the monsoon trough shifted to the foot of the Himalayas on 11—6—1955, causing weakening of the monsoon along the Konkan coast. Markedly unsettled conditions were observed in the north-west and adjoining west central Bay of Bengal on 15—6—1955, causing strengthening of monsoon along the west coast, but they became unimportant on the very next-day. On the same day a low pressure area appeared over Vindhya Pradesh and adjoining south-east Uttar Pradesh, which slowly moved north-east wards and became un-important over north Bihar on 22—6—1955. Under its influence monsoon extended well over North India and was vigorous along the west-coast. An easterly wave moved into the east central Bay of Bengal on 22—6—1955

causing un-settled conditions, which developed into a shallow depression on 24—6—1955, centred about 150 miles east of Calingapatnam and merged with the seasonal trough on 26—6—1955 after weakening. Highly un-settled conditions were observed in the north Bay of Bengal near Sauger Island on 27—6—1955. But they crossed the coast on the same day, became weak and lay as a low pressure area over Vindhya Pradesh and North Madhya Bharat on the last day of the month.

Monsoon was vigorous along the coast throughout the second fort-night with widespread and locally heavy rainfall. Scattered showers occurred in Tamil Nad.

The note-worthy rainfalls and the zonal rainfall in inches are furnished hereunder:—

Note-worthy Rainfalls			Zonal Rainfall			
Date	Name of Place	Rainfall in inches	Name of Zone	Average rainfall for June, 1955	Departure from normal	Remarks
5/6/55	Alleppey	3·5	North	2·4	— 0·1	Just normal
15/6/55	Fort Cochin	6·1				
22/6/55	Pilicode	3·2	East Coast	1·3	+ 0·1	,,
,,	Nileshwar	5·1	Central	1·2	— 0·7	Below normal
24/5/55	Palghat	3·9				
25/6/55	Mangalore	3·9	South	0·6	— 0·1	Just normal
30/6/55	Mercara	4·3				
,,	Kozhikode	3·8	West Coast	35·5	+ 4·4	Above normal
,,	Pattambi	3·0				
			Hills	6·5	+ 1·8	do.

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 12—7—1955.

C. B. M. & M. V. J.

Departmental Notification

Gazetted Service—Postings and Transfers

Name and Present Post	Posted as
Ekambaram, C. (On leave)	D. A. O., Cuddalore
Francis, T. S., Asst., Marketing Officer, Coimbatore,	Regl. Dy. Director of Agriculture, Madurai.
Govinda Kurup, A. D., Manjeri,	Addl. D. A. O., Trichy.
Govinda Kutty Kurup, P., Pepper Specialist, Taliparamba,	Pepper Development Officer, Cannanore.
Kunhiraman Menon, P., Asst., in Chemistry, Coimbatore,	Asst., Agrl. Chemist, Manuring Trials scheme, Coimbatore.
Kasiviswanathan, M., P. A., to D. A. O., Coimbatore,	Addl. D. A. O., Pattukottai.
Kandaswami, M., Lec. in Mycology, Agrl. College, Coimbatore,	To act temporarily as Government Mycologist, Coimbatore.
Meenakshisundaram, K., P. A., to D. A. O., Guindy,	Addl. D. A. O., Madurai.
Sankaranarayana Reddy, N., Asst. Agrl. Eng., Soil Conservation Scheme, Coimbatore,	Asst., Agrl. Eng. (Research), Coimbatore.
Sayeed, P. M., (On leave)	Pepper Specialist, Taliparamba.
Swamikannu, L. Supervisor, Soil Conservation Scheme, Satyamangalam,	Asst., Agrl. Eng. Soil conservation Scheme, Ootacamund.
Sriraman, K., Secy., North Arcot, Market Committee, Vellore,	Asst., Marketing Officer, Coimbatore.
Venkatarama Iyer, S., S. D. A., Taojore,	Addl. D. A. O., Tanjore.
Venkatasubramaniam, P. S., D. A. O., Madurai,	Vice Principal, Gramasevak Training Centre, T. Kalluppatty.

UPPER SUBORDINATES

Name and present post	Posted as
Annappan, R. S., Cotton Asst., Srivilliputhoor,	Cotton Asst., Periakulam.
Alagiriswami, M. A., A. D., Perambalur,	Extension Officer in Agrl. Alangudi.
Balakrishnan, M. P., A. D., Nannilam,	Paddy Asst., Patambi.
Balasubramaniam, R., P. P. A., (Myco.) Pattukottai,	S. D. A., Paddy, Tanjore.
Balagopalan, A. D., Gingee,	A. D., Manjeri.
Doraiswami, G., A. D., Coimbatore,	P. A., to D. A. O., Coimbatore.
Gopalan, S.,	A. D., Alangudi.

Name and present post	Posted as
Ganapathi, A. D., Tiruturaipundi,	A. D., Lalgudi.
Ganapathi, T., Spl. A. D., Udamalpet,	A. D., Coimbatore.
Haridoss Menon, K., A. D., Palakode,	Paddy Asst., Pattambi.
Krishna Iyer, C. S., Cotton Asst.,	Cotton Asst., Srivilliputhoor.
Kunjamma, V. K., Asst., in Millets, Coimbatore,	Librarian, Agrl. College, Coimbatore.
Kandaswami, T. K., Spl. A. D., Pugalur,	P. P. A., Mycology, Pattukottai.
Krishnaswami Rao, T. B., F. M., A. R. S., Koilpatty,	Cotton Asst., Koilpatty.
Kolandaiswami, M. S., Ext. Officer, Alangudi,	A. D., Perambalur.
Kutty Mudaliar, K. S., F. M., Central Farm, Coimbatore,	A. D., Coimbatore.
Lakshmi Ramakrishnan, Asst., in Tuber crop, Coimbatore,	Asst., in Mycology, Coimbatore.
Narayanan Nambisan, P. K., A. D., Mattur,	Paddy Asst., Pattambi.
Narayanaswami, K. R., P. A., to D. A. O., Pattukottai,	P. A., to D. A. O., Guindy.
Rajaraman, N. S., A. D., Lalgudi,	A. D., Alangudi.
Rakana, G. V., P. A., to D. A. O., Trichy,	A. D., Trichy.
Ramakrishna Nambiar, C., Coconut Nursery, Asst., Tikkotti,	Oil Seed Asst., Nileshwar.
Sivasubramaniam, P. K., A. D., Alangudi,	P. A. to D. A. O., Trichy.
Samuel, C. D., Spl. A. D.,	F. M., Satyamangalam.
Sankarasubramaniam, P. A., to Tirunelvelly,	P. A., to D. A. O., Pattukottai.
Sivasubramaniam Udayar, A. D., Alangudi,	A. D., Gramasevak Training Centre, Gandhigram,
Shanmugam, S. P., A. D., North Arcot District,	A. D., Perungathur.
Sundaram Pillai, K., A. D., Coimbatore,	A. D., Pollachi.
Thyagarajan, N. P. P. A., Myco. Betelvine Scheme, Velur,	P. P. A., Myco., Cuddalore.

Review of Market Conditions for Commercial Crops in the Areas of Market Committees During June 1955

Cotton: (In this Section: Candy 784 lb; Bale 392 lb; Pothi 280 lb.) The cotton market at Tiruppur started with a carry over stock of 8,359 candies of Cambodia and 2,509 candies of Karunganni lint in the month, while arrivals totalled to 7,894 candies of Cambodia and 1,571 candies of Karunganni lint inclusive of 552 candies of lint obtained from Salem, Tiruchirapalli and Madurai districts. Despatches from Tiruppur accounted for 6,996 candies of Cambodia and 1,470 candies of Karunganni lint of which 589 candies went out of the notified area to places like Bombay, Ahmedabad, Travancore-Cochin State and other districts within the State. The closing stock was of the order of 9,257 candies of Cambodia and 2,610 candies of Karunganni lint at the end of the period under review.

The kapas market at Tiruppur opened with 30,308 pothis of Cambodia and 50,905 pothis of Karunganni as carry over stock of previous month. Arrivals during the month accounted for 8,369 pothis of Cambodia and 1,179 pothis of Karunganni kapas while disposals of 23,954 pothis of Cambodia and 3,129 pothis of Karunganni were effected leaving a closing balance of 14,723 candies of Cambodia and 3,145 candies of Karunganni lint.

In general the market for both lint and kapas of either varieties revealed indications of a little slackening as to market arrivals usual at this part of the year.

In Koilpatti market there was an opening stock of 3,000 pothis of Karunganni kapas while fresh arrivals amounted to 5,000 pothis during the month. Nearly 7,000 pothis were ginned and disposed to mills leaving a stock of 1,000 pothis at the closing of the month.

The three markets at Virudhunagar, Sathur and Rajapalayam opened with a total quantity of 180 candies of Karunganni lint. About 3,104 cds. of lint including 2,705 candies of Karunganni, 109 candies of Cambodia and 290 candies of Uganda arrived into these markets during the month. After the disposal of a total of 2,654 candies of lint a quantity of 630 candies of Karunganni lint was left over at the end of the month.

The transaction of kapas in the above three markets opened with a carry over of 1936 pothis of which 1920 pothis were Cambodia and 16 pothis Karunganni. The arrivals during the month totalled 30,849 pothis (27,750 pothis of Karunganni and 484 Cambodia and 2,615 of Uganda). Disposals accounted for 32,435 pothis on the whole leaving a stock of 350 pothis of Karunganni kapas at the month end.

Prices (Lint): At Tiruppur the rates for Karunganni lint opened at Rs. 881/- per candy and were seen fluctuating between Rs. 880—893 during the month. At Virudhunagar the market remained more or less steady at Rs. 680—720 a candy for different qualities.

Cambodia Kapas: The prices of kapas at Tiruppur showed a slight decline and ranged from Rs. 107/- to 112/- per pothi. At Virudhunagar market the kapas rates maintained a steady tone and remained at Rs. 70–77/8 per pothi.

Karunganni Lint: The prices of lint at Tiruppur remained steady at Rs. 705/- to 735/- per candy revealing a decline by Rs. 25/- over the rate of the previous month. At Virudhunagar the market rates for the different varieties of Karunganni were of the following order.

K2	Rs. 700—720	per candy.
Karunganni best	„ 660—690	„
Average type	„ 630—656	„
Tinni-Karunganni Mixture	„ 600—620	„

Karunganni Kapas: The price of Karunganni kapas at Tiruppur ruled steady at Rs. 75—80 per pothi. The prices at Rajapalayam and Virudhunagar ranged at Rs. 70—83 for 1st crop and Rs. 57—68 for 2nd crop.

Cotton Seeds: The prices of Karunganni cotton seeds in Virudhunagar market gradually rose from Rs. 13/- to 15 to Rs. 19/- to 20/8 per pothi of 252 lb. The rates for Cambodia seed also showed some improvement and ruled at Rs. 10/8 to 13/8 per pothi of 252 lb.

Groundnut: (Candy in this section means 531 lb. of kernels and bag 80 lb. of pods.) The groundnut markets in South Arcot district opened with a stock of 2,706 tons of kernels. Arrivals in the eight regulated markets totalled 6,049 tons which included 1,827 tons from other districts and 327 tons from outside the State from Andhra. A quantity of 5,242 tons of groundnut kernels was disposed of to local millers and another 213 tons were taken up by village ghannis, while 339 tons and 38 tons were despatched to places outside the district and outside the State respectively. A closing stock of 2,587 tons was left at the month end.

In North Arcot district the stocks with the growers, merchants and at important assembling centres all put together are placed at 6000 tons of pods. Of this 1800 tons were converted into kernels for sale. The disposal in kernel is put at 650 tons inclusive of small despatches outside the district.

The average prices of kernels in the different markets of South Arcot district ranged from Rs. 95/3 in Villupuram market and Rs. 106/4 at Cuddalore per candy. Prices in North Arcot district were in the region of Rs. 88 to 98 per candy and considered as an improvement over the level of previous month but not so compared to the rates of last year during the corresponding period which stood at Rs. 140/- to 145/- per candy. The prices at Virudhunagar market ruled steady at Rs. 103 to 108/- per candy revealing a slight upward trend over the rates of last month.

Gingelly: (Bag in this Section: 2 Mds. each of 82⅔ lbs.) During the month the markets in South Arcot district started with an opening balance of 372 bags estimated to be available with the traders. 490 bags were received in all the Regulated Markets of which Virudhachalam alone accounted for 384 bags. Receipts from outside the district came to 105 bags while there were no arrivals

from other States. The disposals included 9 bags sold to Oil millers and 343 bags to Country chekkus. The month-end stock stood at 375 bags.

The prices of Gingelly remained more or less steady and were in the region of Rs. 37—14—0 to 41—14—0 per bag.

Coconut: The four markets in Malabar (Kozhikode, Badagara, Ponnani and Tellicherry) opened with a stock of 4·4 million nuts of the previous month and received 7·3 million nuts during the month. Total disposal by way of local sales and despatches amounted to 5·2 million nuts leaving a closing balance of 6·6 million nuts. Arrivals of coconuts into Manghlore market were considered normal.

Prices in Malabar market ranged between Rs. 92/- to 135/- per 1000 husked nuts. The rates at Mangalore stood varying between Rs. 165–200 for Raw and Rs. 165–200 for dry nuts per 1000.

Copra: (candy in this section is 700 lb.) The opening balance of copra at Kozhikode and Badagara accounted for 3135 candies and 2610 candies were received into these markets during the month. Of the total disposal of 3709 candies, 1767 candies were despatched to other places. The month end stock of 2036 candies were left over in the markets of Kozhikode and Badagara.

The prices of copra showed some improvement during the month. The price fluctuations as between different varieties are extracted below.

(Prices in Rs. per candy of 700 lb.)

Varieties	Kozhikode		Badagara	
	Maximum	Minimum	Maximum	Minimum
Office	330	305	315	300
Edible	355	342	325	310
Rajapur	430	425	420	420
Madras	385	375	375	375

At Mangalore also the prices showed a little improvement and were in the range of Rs. 297/- to 318/- per candy.

Arecanut: Mangalore market opened with a stock of 2942 cwts and 9101 cwts were added to this by fresh arrivals. Disposals

and exports accounted for 8743 cwts leaving a closing stock of 3300 cwts.

The prices of Supari which opened at Rs. 140–160 per cwt improved steadily and touched Rs. 155–172 towards the closing of the last week of the month. The rise in prices is ascribed to better demand and low stock position in the market. The price ranges of Supari in Mangalore market are extracted below:

(Price in Rs. per cwt.)

Varieties	Maximum	Minimum
Mangalore Supari	172	140
Malabar ,,	155	125
Koka ,,	135	90

The stock of arecannt at Kozhikode and Ponnani markets at the beginning of the month was estimated as 565 bags (100 lb each) and 2961 bags were received further during the month. Disposals both by way of local sales and despatches were in the order of 40 and 2508 bags respectively leaving a closing balance of 978 bags at the end of the month. The prices were ranging between Rs. 146–165 per bag and revealed satisfactory gain over the levels prevailing in the last month.

A regulated market for arecanut was opened at Kuttipuram near Tirur on 8—7—1955 by the Minister for Agriculture and it is expected that sizeable transactions will be handled in on Arecanuts produced in the neighbourhood mostly in Ponnani taluk.

Tobacco: (candy in this section is 500 lb.) In Coimbatore district during the month a quantity of 4890 condies of chewing and 1,456 candies of cheroot tobacco were disposed of to merchants outside the district and despatched to destinations like Palghat, Ramanathapuram, Travancore-Cochin State, Vellore, Tirupathur, Madras, Tiruvarur and Pudukottai. The month end stock was estimated to be 13,535 candies of chewing and 4,245 candies of cheroot tobacco.

The tobacco continued to rule firm as in the previous month. Prices of the different varieties that prevailed during the month were as extracted below.

(Price in Rs. per candy)

Varieties	I Grade	II Grade	III Grade
1. *Chewing varieties*			
(Sun cured)	4		
(a) Meenampalayam	450—500	350—430	200—300
(b) Other varieties	400—425	250—325	190—240
2. *Cheroot varieties*			
(Sun cured-grown in Erode and Bhavani taluks)	200—240	140—180	100—120
3. *Chewing variettes*			
(Pit cured-grown in Palladam and Sulur areas)	190—220	150—180	100—140

Compiled by
The State Marketing Officer,
Madras.

Activities of the Market Committees during the month of June 1955

I. Of the seven Market Committees in the State only five in the districts of North Arcot, South Arcot, Coimbatore, Malabar and South Kanara continue to be actively functioning. The activities of the committees at Ramanathapuram and Tirunelvely continue to be restrained due to the injunction order of the Madras High Court.

The following progress was made by the Market Committees during the month in the issue of licences under Madras Commercial Crops Market Act.

	Section 5 (1)		Section 5 (3)		Weighmen		Brokers	
	A	B	A	B	A	B	A	B
North Arcot Market Committee	46	740	16	343	9	279	...	10
South Arcot Market Committee	64	1343	95	1322	84	542	...	5
Tirunelveli Market Committee	...	36	...	15	...	17	...	...
Coimbatore Market Committee	27	70	34	102	...	...	...	...
Malabar Market Committee	20	305	38	970	22	126	...	5
South Kanara Market Committee	9	204	8	171	1	38	...	...

(A — During the month B — Upto month)

The total of transaction in commercial crops in 13 Regulated Markets in the State during June, 1955 is shown consolidated below:

Crop	Quality	No. of Regulated Markets
1. Groundnut kernel	3951 tons	10
2. Gingelly	539 bags (2 Mds. each 82⅔ lb.)	5
3. Cotton lint	455 candies of 784 lb. each	3
4. ,, Kapas	282 Pothis of 282 lb. each	3

II. **Meetings:** No meetings were held by either by South Arcot Market Committee or Malabar Market Committee during the month. The other committees are functioning under the respective collectors of the district under Section 6A of the Madras Commercial Crops Market Act.

III. **Special Features:** A regulated market of Malabar Market Committee for Arecanut was declared open at Kuttipuram by the

Minister for Agriculture on 8—7—1955. The function was largely attended by growers and traders and other prominent people of Malabar.

IV. **Quality Appraisal:** South Arcot Market Committee continued its work on the studies on the quality of groundnut kernels marketed in six of its regulated markets including Panruti on the basis of random sampling. A total of 697 samples of kernels were drawn and analysed from arrivals with six regulated markets from 13,923 lots comprising 3,795 tons. Some details of the results of analysis done in six markets during the month on dryage and total refractions (comprising of (1) Dirt and Foreign matter (2) Nuts in shell (3) Damaged ones (4) splits (5) Brokens and (6) shrivelled are of interest and are extracted below.

Particulars	Markets					
	Panruti	Cuddalore	Villupuram	Tindivanam	Tirukoilur	Vriddachalam
1. *Dryage:*						
2% and below	21	4	2	34	31	80
3% ,,	2	31	2	17	..	39
4% ,,	9	26	6	18	29	7
5% ,,	8	34	3	11	29	2
6 to 10%	34	65	64	19	..	2
Over 10%	23	6	13	5	...	2
2. Total refractions on						
4% and below	72	71	50	..	90	113
5% to 8%	2	30	36	13	48	7
Over 8%	..	5	4	91	..	12

From the details seen above the quality of Groundnut kernel marketed at Vriddachalam seems to be superior in points of dryage and also on basis of total refraction. There is excessive total refraction at Tindivanam while the quality factors of Cuddalore arrivals are of average type. These data are being collected and will be statistically interpreted in due course for the benefit both the producers as well as traders.

(From the State Marketing Officer, Madras)

Sale of Groundnut in North Arcot District

by

K. SRIRAMAN

Secretary, North Arcot Market Committee, Vellore

Out of a normal production of one lakh tons of groundnut kernels in North Arcot district about 5,000 tons are utilised for edible purposes. Nearly 12,000 tons of kernels are required for seed material and this quantity is sold as pods in the villages. The rest 83,000 tons are assembled in the various centres, as pods or as kernels and sold either directly or through commission mundies or have them auctioned in the decorticating premises to the consumers like the exporters and the oil crushers or to the merchants. The Statement I below, gives an approximate idea of the quantities involved in the different methods of marketing groundnut obtained in North Arcot district.

STATEMENT I

(In tons of kernels)

Assembling Centres	Quantity normally assembled	Sold directly to consumers or merchants		Sold through commission mundies as kernels	Sold in the decorticating premises as kernels
		as pods	as kernels		
(1)	(2)	(3)	(4)	(5)	(6)
Thiruvannamalai Tq.					
Thiruvannamalai	13,000	4,500	500	3,000	5,000
Thiruppathur Tq.					
Thiruppathur	10,000	7,000	500	500	2,000
Gajalanaickenpatti	1,000	1,000	..	..	..
Vaniyambadi	2,000	..	..	2,000	..
Arni Tq.					
Arni	9,000	5,000	..	..	4,000
Vellore Tq.					
Vellore and Katpadi	4,000	..	2,500	1,500	..
Ambur	500	..	500	..	..
Wallajah Tq.					
Arcot	7,000	2,000	4,000	..	1,000
Ammur	1,000	1,000	..	..	..
Kalavai	2,000	2,000	..	..	..
Thimiri	1,000	1,000	..	..	..
Polur Tq.					
Polur	1,500	1,000	300	100	100
Chetput	2,500	2,500	..	..	..
Kalambur	1,500	1,500	..	..	..
Santhavasal	1,000	1,000	..	..	..

(1)	(2)	(3)	(4)	(5)	(6)
Gudiyatham Tq.					
Gudiyatham	8,000	6,000	2,000	..	..
Peranambut	1,500	1,500	..	..	..
Cheyyar Tq.					
Cheyyar	3,500	3,500	..	..	..
Kovilur	1,000	1,000	..	..	..
Wandiwash Tq.					
Wandiwash	2,000	2,000	..	..	..
Desur	1,000	1,000	..	..	..
Other centres	21,000	21,000 (12,000 for seed)	..	..	..
Total	95,000	65,500	10,300	7,100	12,100

It is seen that most of the sales is as pods direct to the consumers are merchants. Of late, the auction sales in the decorticating premises is coming into prominence. This has affected the business of the commission mundies. The relative merits of these methods are discussed in the following paragraphs.

Nearly two-thirds of the production of groundnuts in North Arcot district (65,500 tons) is generally purchased during the season as pods, by the big merchants or the consumers like the exporters of kernels or oil crushers, in the assembling centres like Tirupattur, Arni, Thiruvannamalai, Gudiyatham, Cheyyar, Chetput and Kalavai. When better prices are offered later in the season, they are sold or exported. In this system of sales, the merchants mainly depend upon the possible rise in prices, with the advancement of the season and hence stake their all, by outright purchases at the beginning of the season in October to December. The poor agriculturist is unable to withold his stocks till better prices are offered and hence sells his produce to the merchants, soon after harvest. Sale as pods (65,500 tons) is more prevalent than sale as kernels (10,300 tons) is more prevalent than sale as kernels (10,300 tons) and the author has already drawn attention to the losses incurred by the agriculturists in such transactions (Madras Agric. J. Vol. XLII, p. 85). Formation of growers' co-operative societies, which can advance monies on produce pledged and market the produce at advantageous prices at a later date would go a long way in improving the income of the agriculturists.

The system of sale through "commission mundies" is prevalent in certain places like Vellore, Thiruvannamalai and

Vaniyambadi where nearly 7,000 tons of kernels get marketed this way. The villagers bring their produce to known "mundies", from which they might have taken advances for cultivation or for other family expenses. If not already taken they would take some advance, at the time the produce is brought to the mundy. The commodity is left at the mundy for sale which may take place at times even after about a month or two. Mostly the sales are effected within a fortnight. The commission mundy owner gives advance loans, supplies empty gunnies for bringing the produce and accommodates the bags in his godowns till sales are effected. For all these services, he charges some commission which is readily paid by the agriculturist as it saves a lot of worry for him. Thus, the commission mundy owners play an important part in financing, assembling and storing groundnuts. In this system, the agriculturists are compelled to market their produce, through the commission mundies only, though they know fully well that the mundy owners are exploiting them and are making large profits at their expense. Aid by the Reserve Bank of India to give loans to the agriculturists in advance for cultivation, through the State Banks or the Co-operative Societies on their executing a bond, to bring their produce for sale to the recognised places of sale like the regulated markets or the co-operative sale societies would be of great adventure to the agriculturists.

Of late, the system of decorticator owners finding purchasers, for the decorticated produce in their mills, is prevalent in places like Tiruvannamalai, Arni, Tirupattur and Arcot. Nearly 12,000 tons of kernels are being sold in this manner at present, and is likely to be more popular at the expense of the commission mundy business. At all these places except Tiruvannamalai, the decorticator owners send word to the traders and oil mill owners intimating the availability of kernels for sale. Persons interested, peep in at their leisure and strike a bargain, if favourable. The villager, being new to the current conditions expects the decorticator owner to assist him in disposing off the produce quickly and at a favourable price. A commission is charged for such a service and some times it is done free also. In this system, the villager is entirely dependent on the honesty of the decorticator owner. This method can be improved by establishing a regulated market where all the produce can be assembled and sanctioned to fetch the best price.

At Tiruvannamalai, the method of sale in the decorticating premises, is a little improved. In this place, there are more than

a dozen decorticators, daily shelling pods and offering the kernels for sale. The oil crushers and the exporters of this district and form outside, daily start during the season, at about 4 p.m. from one end of the town in a group. When thay enter a decorticator premises, the lots there are auctioned one by one by the decorticator owner following the close bid system. For each lot, the would-be purchasers offer their price in writing to the decorticator owner. The bid chits are arranged according to the price offered and a second chit increasing the price, is allowed if a purchaser finds that his chit has gone down in the order. The highest bid offered, is considered by the decorticator owner and the owner of the produce jointly and is either accepted or rejected. The next lots are auctioned one by one on the same pattern. After finishing the lots available in one decorticating premises, the would-be purchasers move on as a body to the other decorticatlng premises one by one till they finish all the available lots in the town. In this system, there are some defects. The decorticator owner is able to choose the purchaser, by refusing to part with a lot, for a particular price and selling the same, the next hour, to a man of his choice, without auction, for the eame price. This kind of manipulation is very unhealthy, as no sancity is attached to the auctions held. The most important objection to this system is that the price levels of each purchaser, is liable to be disclosed, even in the first few bids, in a decorticating mill. In order to avoid exciting the market, the best bids would not be forthcoming in the first rounds, and hence, the price fetched in the first few mills visited are mostly low. As the purchasers move on, the tempo increases and the parties would have sensed the market position and the bids in the end places would be fashioned after that day's existing conditions. In a rising market the end mills would get better prices than the first mills while in a falling market the first mills may sometimes have the advantage. It was observed on one day that while the first bids in the first two mills was only Rs, 95/- per candy, it rose up to Rs. 109/- in the end mill, for 'pucca' quality of kernels, per candy of 531 lb. as there were favourable advices from the Madras market that day. On another day, the bid started at Rs. 110/- and came down to Rs. 95/- per candy of kernels as the market advices were weak. The information given in the day's morning papers, the advice given in the letters received by the parties that day, the availability of the stocks, the study of the requirements of the various parties assembled, and the rivalry of the concerns, play a great part in deciding the prices and their trend. Perhaps

this defect may be partly rectified, by asking the bidders to go round all the decorticating premises and give their close bids all at a time in a central place. Better still, an arrangement where all the lots of groundnuts offered for sale, could be assembled in a central place for auctioning by the close bid system would be welcome. This is just the idea of a regulated market. The purchaser can go round and estimate the arrivals and the quality and then declare his maximum prices for each lot in a slip according to his requirements. In this system the maximum bids would have to be given by all at the same time, being in the dark about the market conditions. The grower would thus get the best price for his produce. Perhaps the defect in this system may be that the purchaser is not sure of the quantity he would be getting, as the acceptance of his bid depends upon the other bids. At times, he gets more stocks than he wishes for, while at other times, he is not able to cover his requirements. Yet another defect that may be pointed out is the cart-fare involved in transporting the groundnuts from the decorticating premises to the central market. This can be rectified, if bids are allowed on samples or on standard specifications.

The above kind of assembling groundnuts in a central place called the regulated market, and auctioning the produce daily by the close bid auction system, has been successfully adopted by the South Arcot Market Committee for the past fifteen years. The growers themselves bring their produce to the regulated markets for sale and the consumers like the oil mill owners and the exporters find it extremely easy to have their purchases effected expeditiously and according to their requirements. The commission mundies have mostly gone out of trade in South Arcot district and at present nearly 95% of the produce grown is marketed by the growers themselves through the eight regulated markets established by the South Arcot Market Committee throughout the district. The North Arcot Market Committee, started about an year back, has also arranged for such a system of assembling and auctioning of groundnuts in North Arcot district at the regulated markets of Vellore and Tiruvannamalai. Three more regulated markets would be started at Tirupattur, Arni and Arcot in the near future.

While the market committees are able to effectively dispose of the produce at an advantageous price to the agriculturists and also be of service to the traders by assembling them at a place for their close scrutiny and appraisal of the market conditions, the problems of long duration storage and financing remains untackled,

as these functions are beyond the the scope of these regulated markets as envisaged by the Madras Commercial Crops Markets Act 1933. The co-operatives can step into this gap and be of great service to the groundnut trade. The starting of bonded warehouses conforming to the Madras Warehouses Act, under the management of the co-operatives would be a useful step in tackling the problem of storages. It is stated that the Reserve Bank of India contemplate provision of loans to the agriculturists even for meeting the cultivation expenses. Such a move would solve the problem of financing.

The combinatisn of the co-operative movement and the market committees can be expected to wean the agriculturist from the obligations of the commission merchants. This does not mean that the commission merchants should not exist. They have also got their functions in the marketing of groundnuts. They can advance monies to the few needy agriculturists that cannot pledge any produce but would require capital for cultivation. Such produce brought to their mundies can be sold at the best prices, comparable to the prices obtained in the regulated markets. For the services rendered, they can charge a reasonable commission. Under the Madras commercial Crops Markets Act, in the notffied areas the maximum commission charges are fixed by the market committees. They can also advance monies temporarily on the produce pledged by the traders, after purchase in a regulated market. When the outside purchasers hook in large quantities than their requirements, they necessarily fall short of the money required for payment immediately and also may find it difficult to move their produce expenditiously from the regulated market. The co-operatives may take time to accomodate such urgent cases, and the commission merchants, can be useful in this direction.

There cannot be prescribed any hard and fast system of sale for each commodity or place. The best policy would be to improve the existing conditions, by slowly organising regulated markets and bonded warehouses so that the growers may get fair prices for their produce, while the traders may by enabled to gauge the situation and offer remunerative prices for the quantities required by them.

Crop and Trade Reports

Cotton—1954-'55 Fifth and Final Forcast Report, Madras State: The area under cotton upto 25th March 1955 for the Madras State is estimated at 8,71,700 acres. Compared with the finally recorded area of 8,59,000 acres for the previous year and an average area of 7,84,200 acres calculated for the five years ending with 1953-'54, this is an increase of 1·5 per cent and 11·2 per cent respectively. An increase in area is estimated in all the districts of the State except in North Arcot, Maiabar and South Kanara and the Nilgiris. The area estimated is the same as that last year in North Arcot, Malabar and South Kanara districts and the area in the Nilgiris district is little and negligible. Pickings of cotton is in progress. The crop was affected by insufficient water supply in the later stages of its growth in the districts of North Arcot and Ramanathapuram. It was also affected by pest attack in the districts of Coimbatore. The condition of the crop in the other districts is generally satisfactory.

The yield per acre is estimated to be slightly higher than that of last year. The seasonal factor for the State as a whole works out to 92 per cent of the normal as against 91 per cent for the previous year. On this basis, the total yield works out of to 2,70,500 bales of 392 lb. lint for the previous year and an average yield of 2,61,000 bales for the five years ending with 1953-54, reprcsenting an increase of 2·2 per cent and 3·6 per cent respectively. It is however too early te estimate the yield with accuracy as much will depend upon the future weather conditions and their effect on the second crop.

The estimated area and yield of cotton by varieties in the current year, together with the corresponding figures for the previous year are given below:

Variety		Area in '00' acres		yield in '00' bales of 392 lb. lint	
		1954—55	1953—54	1954—55	1953—54
Madras American (Cambodia)	Irrigatted ..	1101	1390	729	938
	Unirrigated ..	1047	1290	279	338
Madras American (Cambodia-Uganda)	Irrigatted ..	477	170	319	119
	Unirrigated ..	758	461	188	110
	Total Cambodia ..	3383	3311	1515	1503
Uppam in Central districts	..	641	632	104	127
Nadam and Bourbon	..	5	5	*	*
	Total Salem ..	646	637	104	127
Tirunelvelies (a)	..	1075	1065	265	228
Karunganni	..	3613	3577	281	788
	Total ..	4688	4642	1086	1016
	Grand Total ..	8717	8590	2705	2646

*Less than 50 bales.

(a) Includes mixed country cotton grown in the South.

The wholesale price of cotton lint per standard maund of 82 2/7 lb. or 3,200 tolas as reported from certain market centers on 30—4—55 was Rs. 88—12—0 for Coimbatore Cambodia Rs. 73—7—0 for Coimbatore Karunganni, Rs. 84—11—0 for Cambodia at Erode and Rs. 65—10—0 for Tirunelvelies. Compared with the prices which prevailed in the corresponding period of last year, these prices reveal a decrease of 21·4 per cent in the case of Tirunelvalies, 18·7 per cent in the case of Coimbatore Karunganni, 10·0 per cent in the case of Cambodia at Erode and 9·8 per cent in the case of Coimbatore Cambodia.

Ginger—Third and Final Forcaste Report—1954-'55—Madras State: The area under Ginger in 1954–55 in the Districts of Madurai, Malabar, South Kanara and the Nilgiris is estimated at 14880 acres. Compared with the area of 15250 acres estimated for the corresponding period of last year it shows a decrease of 2·4 per cent. Compared with average area of 13490 acres calculated for the previous five years ending with 1953-'54 the present estimate reveals an increase of 10·3 per cent. An increase in area is estimated in the districts of Madurai, South Kanara and the Nilgiris and a decrease in the district of Malabar. The yield per acre is estimated to be normal in the districts of South Kanara and the Nilgiries and slightly below the normal in the districts of Madurai and Malabar. The total yield is estimated at 5090 tons of dry ginger. Compared with the estimated yeild of 5440 tons of dry ginger for the corresponding period of last year it is an decrease of 6·4 per cent. Compared with the aveage yield of 4530 tons of dry ginger calculated for the previous five years ending 1953–54, the present estimate reveals an increase of 12·4 per cent.

The wholesale price of dry ginger per maund of 82 2/7 lb. or 3200 tolas on 5—3—1955 was Rs. 91—14—0 at Mangalore. Compared with the price in the corresponding period of last year this is an increase of 85·2 per cent.

Sugarcane Fourth and Final Forecast Report—1954-'55—Madras State: The area under Sugarcane in Madras State during 1954–55 is estimated at 1,10,700 acres (95,930 acres under planted crop and 14,770 acres under ratoon crop). Compared with the finally recorded area of 90,020 acres (78,190 acres under planted crop and 11,830 acres under ratoon crop) for the previous years, this is an increase of 23·0 per cent. Compared with the average area of 98,130 acres for the previous five yeares ending with 1953–54, the present estimate is an increase of 12·8 per cent. The increas in area this year is due to favourable seasonal conditions at the time of planting. A decrease in area is estimated in the districts of Ramanathapuram, Tirunelvely, Malabar and South Kanara and an increase in the other districts of the State except the Nilgiris where the acrage under the crop is little or negiligible. The crop has been harvested or is being harvested in many districts. The yield per acre is slightly lower than that of last year.

The seasonal factor for the State as a whole works out to 95 per cent of the normal as against 96 per cent of the normal estimated for the previous year. On this basis, the total yield works out to 28,61,180 tons of cane, gur equivalent of which is 3,12,310 tons as against 23,39,010 tons of cane with a gur equivalent of of 2,54,900 tons estimated for the previous year representing an increase of 22·5 per cent. Compared with an average yield of 24,12,810 tons of cane with a gur eqvivalent of 2,64,830 tons calculated for the previous five years ending with 1953–54, the present estimate shows an increase of 17·9 per cent. The average wholesale price of jaggery per maund of 82 2/7 lb. or 3,200 tolas at important market centers on 7—5—1955 was Rs. 14—11—0 in Mangalore, Rs. 8—0—0 in Tiruchirapalli, Rs. 6—4—0 in Salem, Rs. 7—9—0 in Cuddalore and Rs. 7—4—0 in Vellore. Compared with the prices which prevailed in the corresponding period of last year, these prices show a fall of 60·0 per cent in Salem, 46·3 per cent in Vellore, 45·3 per cent in Tiruchirapalli, and 14·2 per cent in Mangalore.

Chillies—First and Final Forecast Report—1954-55—Madras State: The area sown with chillies in the Madras State in 1954–55 is estimated at 1,39,500 acres. Compared with the actual area of 1,37,700 acres for the previous yeear and an average area of 1,25,700 acres calculated for the five years ending with 1953–54, this is an increase of 1·3 per cent and 11·0 per cent respectively. A decrease in area is estimated in the districts of Chingleput, Coimbatore, Tiruchirapalli and Ramanathapuram and an increase in area in the other districts of the State except in South Arcot, North Arcot and the Nilgiris where the area estimated is the same as that of last year. The crop has been harvested or is being harvested in parts of the State. The crop is reported to have been affected by pest in Ramanathapuram district. The condition of the crop is reported to be to be generally satisfactory in the other districts of the State. The yeild per acre is estimated to be normal in Salem, Tiruchirapalli, Tanjore, Tirunelveli and South Kanara districts and slightly below normal in all the other districts of the State.

The seasonal factor for the State as a whole works out to 97% of the normal which is the same as that for the previous year. On this basis, the total yield for the State as a whole works out to 73,900 tons of dry chillies, Compared with the yield of 72,800 tons of dry chillies estimated for first year, this is an increase of 1·5 per cent. Compared with the average yield of 59,200 tons calculated for the previous five years ending with 1953–54, the present estimate is an increase of 24·8 per cent. The average wholesale price of chillies per maund of 82 2/7 lb. or 3,200 tolas as reported from important market centres on 12—3—1955 was Rs. 65—14—0 in Coimbatore, Rs. 61—11—0 in Mangalore, Rs. 52—0—0 in Tiruchirapalli, 51—11—0 in Tuticorin, Rs. 50—15—0 in Madurai, Rs. 49—3—0 in Tirunelveli and Rs. 44—7—0 in Cuddalore. Compared with the prices which prevailed in the corresponding period of last year, these prices show a decrease of 44·9 per cent in Cuddalore, 34·2 per cent in Tirunelveli, 33·8 per cent in Tiruchirapalli, 31·1 per cent in Madurai, 25·4 per cent in Madurai, 25·4 per cent in Tuticorin, 22·8 per cent in Coimbatore and 8·8 per cent in Mangalore.

ERRATA

Madras Agricultural Journal — Market Committees Chronicle for June 1955, page 253, item V of the statement on prices of Arecanut in South Kanara District — please read as "Price per Cwt in Rs." instead of "Price per candy of 700 lb. in Rs.".

Retirements of Some of Our Members from Active Government Service

The following gentlemen have retired from Government service during the year 1954–55. We wish to place on record our sincere thanks to them for all the help they have rendered to the Madras Agricultural Students' Union, either in their official capacity or as functioneries of the Union. We wish thrm long life, health and happiness during their retired life. We fervently hope and trust that they will continue to evince the same keen interest in the activities of the Union and do all in their power to further the prospects of the Union and the Madras Agricultural Journal.

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Sri M. Kanthiraj	— Formerly Dy. Director of Agriculture, Madras, retired as Director of Agriculture and Fisheries, Andhra State.
,, G. V. Narayana	— Formerly Vice-Principal and Oil Seeds Specialist, Coimbatore, retired as Principal, Agricultural College, Bapatla, Andhra State.
,, C. S. Krishnaswami	— Retired as Plant Protection Officer (Mycology), Coimbatore.
,, C. Rajasekhara Mudaliar	— Retired as Systematic Botanist and Professor of Botany, Agricultural College, Coimbatore.
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,, K. Ramaswami	— Retired as Superintendent, Central Farm, Coimbatore.
,, K. S. Krishnamurthy	— Retired as Special District Agricultural Officer, Tanjore.
,, P. K. Natesa Iyer	— Retired as Farm Manager, Ambalavayil, Wynad.
,, C. V. S[illegible]arayanan	— Retired as Assistant to the Paddy Specialist, Coimbatore.
,, S. [illegible]swami Iyer	— Retired as Special Officer, Agro-Economic Research Unit, Madras University.
,, M. [illegible]asiraju	— Formerly Government Agricultural Chemist, Coimbatore, retired as Agricultural Chemist, Bapatla.

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