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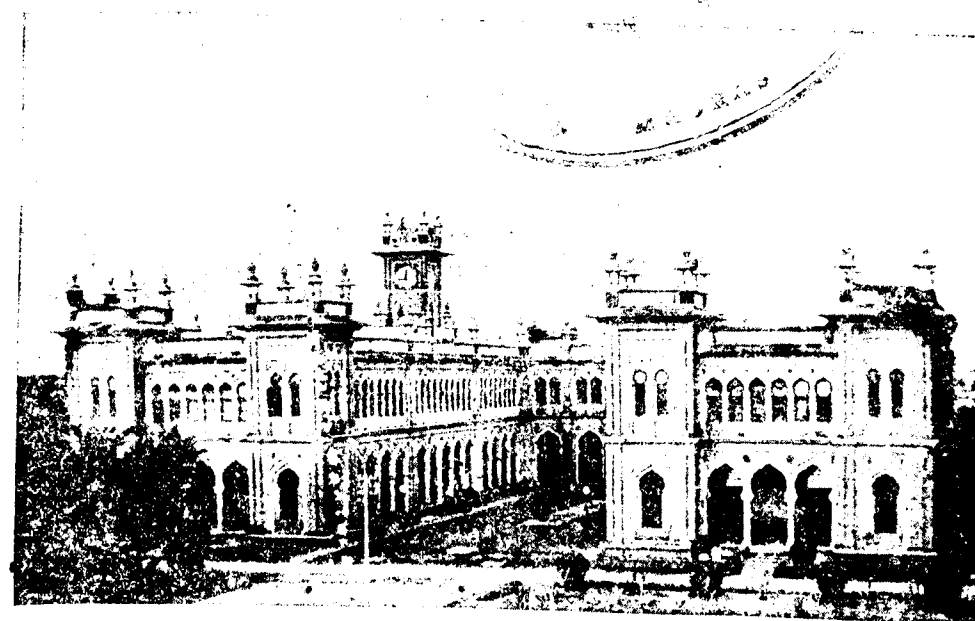
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THE
Madras Agricultural Journal

Vol XLV

December 1958

No. 12



AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, COIMBATORE

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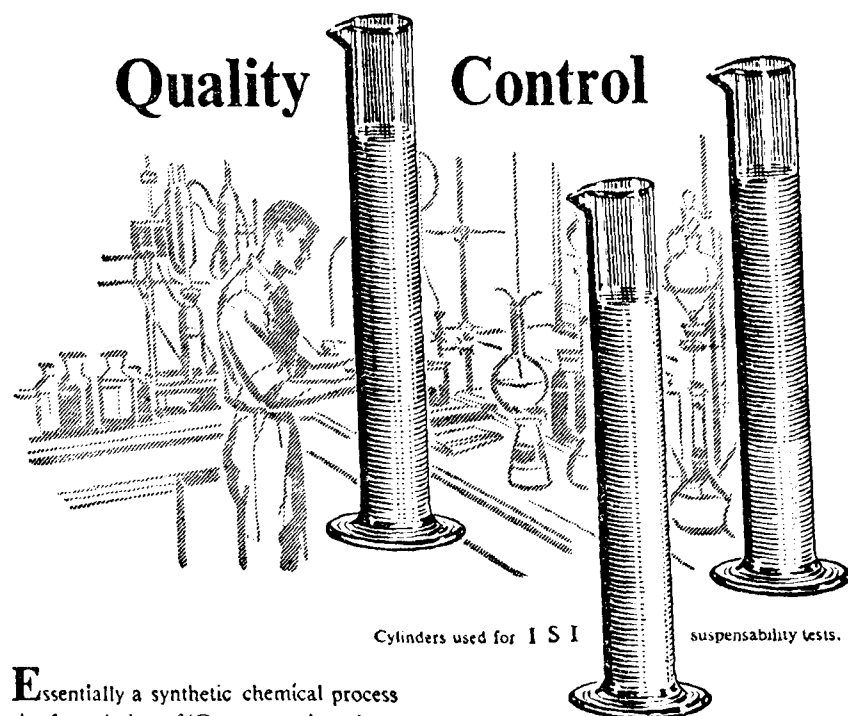
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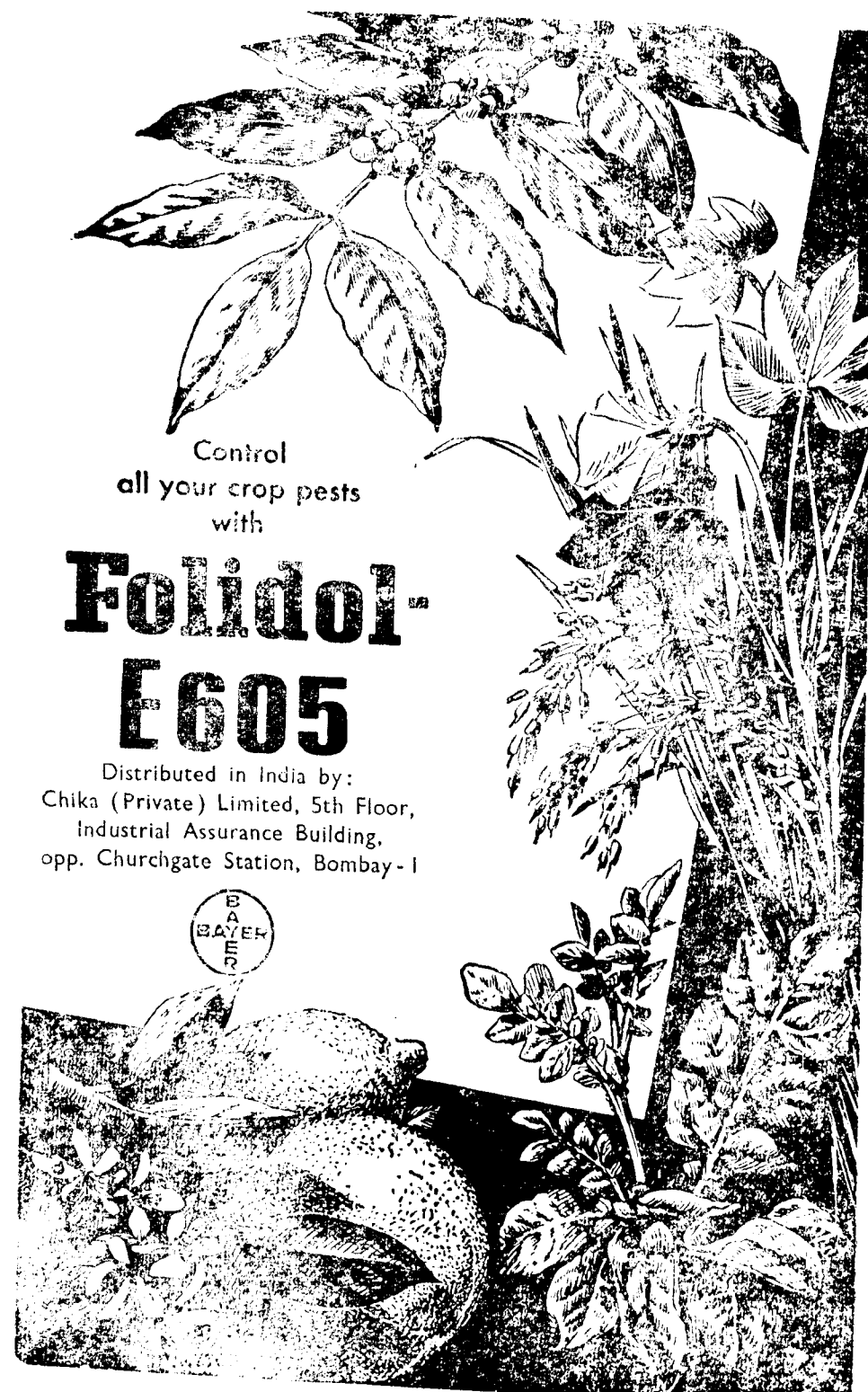
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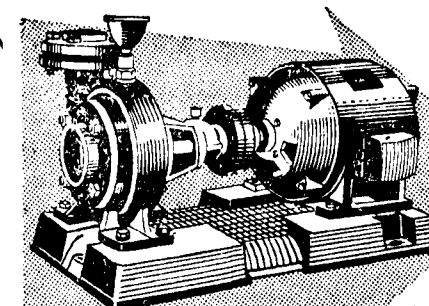
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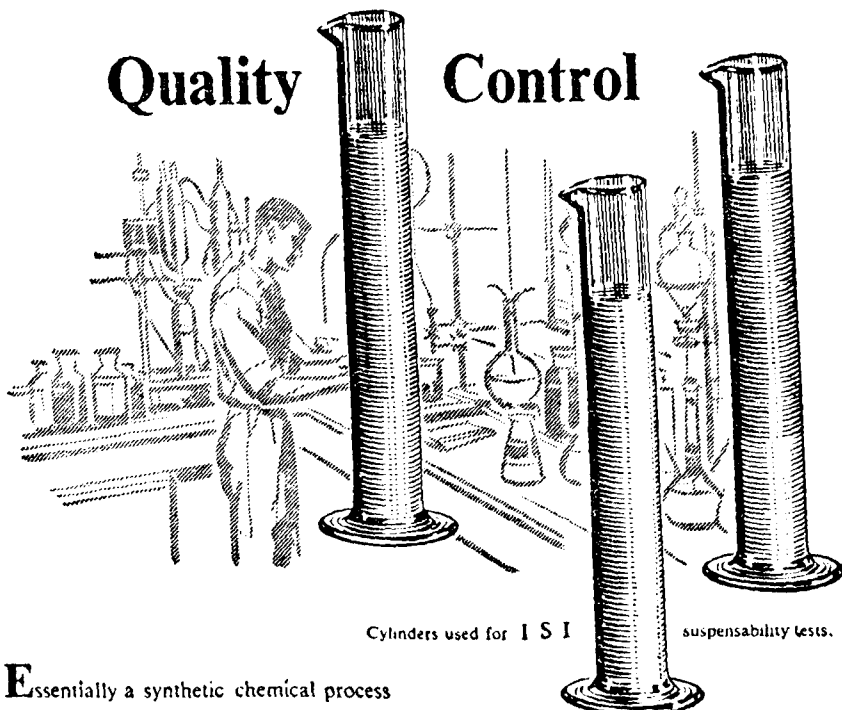
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THE MADRAS AGRICULTURAL JOURNAL

Hints to Contributors

The pages of the Madras Agricultural Journal shall be open ordinarily only to the members of the Madras Agricultural Union.

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Madras Agric. J., 45: (12) 445-450, 1958

Preliminary studies of hydrocyanic acid content in the fodder sorghum of the Madras State

by

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Introduction: Sorghum is not only a food crop but also a fodder crop in India. Its adaptability to droughty conditions and its high production of forage, has given it an important status in Agriculture of this country. A large percent of the cattle subsist on this forage and it is preferred to others because of its palatability and nutritive value. In such an important crop, the presence of hydrocyanic acid in lethal doses in its seedling stage has been a drawback. As the plants mature, the poison content decreases and it is a well known fact that even the green stalks can be fed to cattle after the flowering stage. The preliminary study presented in this paper is on hydrocyanic acid content of the five important fodder types of the Madras State at their growth period and has deduced the earliest safe stage when the plants can be cut and fed to cattle.

Previous work: The first instance of cattle poisoning by sorghum fodder was recorded in 1900. In the year 1902 the poison was traced as hydrocyanic acid (also known as prussic acid) (Dunstan and Henry — 1902). It is present as a glucoside called "Dhurrin" which on hydrolysis liberates hydrocyanic acid. Presence and the quantity of the glucoside vary with the age of the plants, conditions of growth and the variety. As the plants mature, the acid content becomes low (Laude and Swanson 1933). Acharya (1933) observed that during the early stages of growth there is 0.2% to 0.3% of hydrocyanic acid. Then it decreases gradually and at 0.02% it is considered harmless to animals. Leaves contain 60% of the total hydrocyanic acid in the whole plant structure, the upper leaves having a greater concentrate. The acid content is low in the morning, gradually increases up to 2 p. m., then falls in the evening and there is a rapid decline in the night. Young plants, ratoons, secondary shoots and side shoots are rich in hydrocyanic acid. Drying in the shade shows a decrease of ten percent acid content and sun drying decreases to 30—40 percent. The best method of lowering

the poison is silaging where it is considerably reduced. Boyd *et al* have found out (1938) that high nitrogen and low phosphorous of the soil, increase the acid content in the plants. Drought has an indirect effect to increase the poison. Regarding the relationship between irrigation and cyanogen content, Franzke *et al* (1939) have found that the crop grown under irrigated conditions has a lower hydrocyanic acid as compared to crop raised under rainfed conditions. Vinall (1921) has found that hydrocyanic acid content has been found to increase with the incidence of insects and sorghum plants attacked by aphid were found to have double the quantity of the glucoside. The high and low content of the acid have been found to be basically controlled by heritable factors in wild sorghum (*S. sudanense*). The sweet Amber sorgho has been found to have very low hydrocyanic acid content and the low acid content is partly dominant to high content of acid (Franzke *et al* 1939). The wild sorghum, *Sorghum verticilliflorum* has been reported to be dangerous to stock throughout the period because of the high hydrocyanic acid content (Winks 1940).

Materials and Methods: The materials experimented upon belong to five special fodder types of the Madras State and their descriptions are given below :

1. *Cholam strain Co. 11* : This is a short duration Patcha Jonna from Nandyal, Andhra State, belonging to *Sorghum durra* var. *mediocre* (Snowden 1936). The duration of this strain, seed to seed, is 115 days. It is grown both under monsoon and summer seasons. Under irrigated conditions a tonnage of 20,000 lbs. of green fodder per acre is obtained. The stalks are sweet and juicy and grow to a height of 6 feet.

2. *Cholam strain Co. 10* : Cholam Co. 10 is a mutant for its long duration from strain Co. 11 (Ayyangar *et al* 1937). Its duration is 160 days and this also belongs to *Sorghum durra* var. *mediocre* (Snowden 1936). The best sowing time is June - August and its green straw yield is 60,000 lbs. per acre. Stalks are sweet and juicy and the crop attains a height of 8 to 10 feet.

3. *Cholam strain K. 1* : This is a pure line selection of the Irungu Cholam, *Sorghum dochna* var. *irungu* (Snowden 1936) of Tirunelveli district where it is grown purely for fodder. It has a duration of 125 days and is always sown in the months of August - September as a rainfed crop. The stalks attain a height of 6 feet and green fodder of 15000 lbs., per acre is obtained. The stalks are thin, pithy and sweet.

4. *Cholam strain K. 3* : It is an improvement over Cholam K. 1 and is an extracted type evolved by crossing Irungu Cholam (*Sorghum dochna*) with Periamanjai Cholam (*Sorghum durra*) of Coimbatore and is a grain cum fodder strain, and is popularly termed as Periamanjai Irungu. From its botanical characters it has been fixed as *Sorghum dochna*. It has the same duration of K. 1 but gives an acre yield of 20,000 lbs. of green fodder per acre. Plants grow to a height of 6 to 8 feet and its stalks are pithy and sweet (Ponnaiya and Anavardham - 1933).

5. *Selection A. S. 8208* : This selection has been received from China and has been classified as *Sorghum nitens*. The duration is 100 days and is a tillering type having 4 to 5 tillers. Plants attain a height of 6 feet and come up throughout the year and yield 10,000 lbs. of green fodder. The stalks are thin and pithy (Snowden, 1936).

These strains were sown in the month of August in plots of one cent each. The plots receiving compost manure at 10 tons per acre and the soil is red sandy loam. The seeds were sown in rows 2 links apart at the rate of 30 lbs. per acre and all the agricultural operations were given uniformly to all the five plots. The first samples were gathered when the plants were 30 days old. Thereafter samples were collected at every ten days interval until the plants completed flowering. Plants were selected at random and cut at 1 inch above the ground level.

Estimation of hydrocyanic acid content : Random samples of ten plants were collected, finely chopped and mixed thoroughly. From the well mixed sample, about 100 grams of plant tissue were taken and the hydrocyanic acid was estimated by the method given by Acharya (1933).

Experiment Results : The stages at which the plants were analysed, the hydrocyanic acid content and the duration of the individual strains are presented below :

Discussion : The results corroborate the previous works and there is ample evidence to prove that young cholam seedlings below 50 days old contain a high content of hydrocyanic acid and it decreases from the early stages progressively till the plants attain the boot stage. The safe stage for feeding is below 0.02% level (Acharya, 1933) and the short duration strains Co. 11, K. 1 and K. 3 are free from lethal doses of hydrocyanic acid content after 60 days

Particulars	Age of the crop analysed and the percentage of hydrocyanic acid content						Average height in feet of full grown crop	Duration of the crop (seed to seed in days)	Green straw yield per acre in lb.	Safe period to feed from the time of sowing
	days 30	days 40	days 50	days 60	days 70	days 80				
1. Strain Co. 11	0.0883	0.1017	0.0229	0.0100	0.0105	0.0033	6	115	20,000	60 days
2. Strain Co. 10	0.2397	0.1114	0.0354	0.0254	0.0240	0.0074	8 to 10	160	60,000	80 days
3. Strain K. 1	0.1422	0.0523	0.0271	0.0151	0.0053	0.0043	6	125	15,000	60 days
4. Strain K. 3	0.0832	0.0623	0.0184	0.0086	0.0060	0.0015	6 to 8	125	20,000	50 days
5. Selection A. S. 8208	0.2396	0.1483	0.0326	0.0144	0.0068	0.0022	6	100	10,000	60 days

Note: 0.020% of hydrocyanic acid is considered to be harmless to animals.

of growth while the long duration strain Co. 10 is poisonous to cattle till 80 days of growth. Though selection A. S. 8208 has a very short duration of 100 days it is found poisonous till it is 60 days old presumably due to its tillering habit. This is in line with Martins observation (1933) viz., side tillers and axillary branches contain a high percentage of the acid, as compared to main shoots.

Summary: A preliminary study was conducted to find out the earliest safe period when it can be cut and fed to cattle. Five fodder types belonging to Sorghum species of the Madras State were analysed for hydrocyanic acid content during their growth period at ten days interval. Long duration strain of 160 days was found to be free from lethal dose of hydrocyanic acid when 80 days old whereas strains having 125 days can be cut earlier viz., 60 days after sowing. In the case of tillering variety although the duration is only 100 days it was found to be safe for feeding only after 60 days of growth.

Acknowledgment: Thanks are due to Sri B. W. X. Ponnaiya, B. sc. (Ag.) M. sc., Millet and Pulses Specialist for suggesting this problem, guiding the work and helping in writing up this paper.

Thanks are also due to the Government Agricultural Chemist for rendering necessary facilities in analysing the samples.

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* Original not seen.

CAN THE EARTH FEED MANKIND Irrefutable Facts

The land surface of the earth amounts to 149 million square kilometres. No more than 1,000 Million hectares (1 hectare equals 2.47 acres) are farmed today. And yet, the Soviet soil scientist and geographer Academician L. I. Prasolov estimates that only 11 per cent of the earth's surface could be considered entirely unpopulated today (the Arctic and the Antarctic), and some 19 per cent is made up of deserts. The remaining includes 10.1 per cent of fertile valleys, 38.4 per cent of transitional soils (forest and dry steppe), 13.7 per cent of mountain pastures and forests. Half the desert areas (which comprise 19 per cent) could be reclaimed for agriculture with the aid of irrigation. It follows that more than two-thirds or over 10,000 million hectares of land may be considered suitable for farming and life.

Should this land be developed, with the proper relationships between the crops, the annual production of animal and field husbandry would be adequate to feed at least 25,000 million people a year, i. e., almost ten times greater than the existing population of the earth.

[From "Agriculture and its mechanisation in the Soviet Union" Vol. III. No. 129.]

Madras Agric. J., 45 : (12) 451—454, 1958

Some adaptations in the habits of the Red Hairy caterpillar—*Amsacta Albistriga*

by

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Crop and Plant Protection Officer (Entomology).

and

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Plant Protection Assistant (Entomology), Coimbatore.

Introduction: The red hairy caterpillar has been recorded as a very serious pest of the dry crops in most of the rainfed tracts of the Madras State, for the past five decades. It occurs freely on the red sandy loam areas. Despite its polyphagous habits, the insect shows a marked partiality for groundnut on which the destruction wrought is often severe. Commencing from the earlier rains, a majority of the adult moths emerge during the early stages of the crop and the emergences may be spread over about half a dozen batches. The damage is at its worst when the caterpillars are two to three weeks old. In some cases, there is a second brood, presumably from the short cycle larvae, the adults emerging two or three months later, during the North-east monsoon rains. The essential prerequisite for the mass emergences is the receipt of copious showers, which are necessarily followed by the bountiful supply of food material for the progeny.

From a perusal of the records, the pest has been severe over most parts of the Madras State and some of the adjoining areas. A careful study of these areas has revealed that certain marked variations exist from tract to tract, in the seasonal climatic and other environmental factors. The local agricultural practices, having necessarily to be adjusted according to these factors, the pest also has adapted itself, to a perceptible degree, in its season of occurrence, feeding habits, nature and extent of damage, etc., and the following notes on these aspects may be of some interest.

Broad classification of the infested areas: The areas chronically infested by *Amsacta* can be broadly classified into the following zones, according to the peculiarities in the seasonal and climatic conditions. (1) South Arcot, North Arcot and Salem; (2) Madurai and Ramanathapuram and (3) Pollachi (Coimbatore district).

1. *South Arcot, North Arcot and Salem:* These districts are characterised by a particularly severe summer, which extends up to July. Occasional thunder showers are received during May—

June when the land is ploughed and kept ready. The crops mostly groundnut and a little of cumbu or cholam are sown with the receipt of some sharp showers during June—July and the subsequent progress of the crops depends upon the periodical rains which are usually received upto September. Heavy emergences of the moths may take place after every precipitation but all those prior to about a week or fortnight of the sowing are practically harmless, for the following reasons :

There being no vegetation—cultivated or wild—worth the name prior to the sowing in these areas, the moths lay their egg-masses almost anywhere in the open, like the surface of the soil, clods of earth, stones, bits of wood and occasionally the scanty vegetation available. Bulk of the eggs are destroyed by the scorching heat of the Sun and the rest by the subsequent ploughings. The few caterpillars that might hatch out from the stray egg-masses eventually die for want of food. Real damage is however wrought by the later emergences, during July and August, the grown-up caterpillars being noted about a fortnight after each emergence. The North-east monsoon sets in by about October when the precipitation is heavy and continuous. Consequent to these rains, minor emergences, evidently from the short cycle larvae, are often noted. But these are of no consequence, since the groundnut crop gets strongly established by that time, with the pods well-developed underground.

2. *Madurai and Ramanathapuram*: These tracts do not evidently have the benefit of the earlier showers and the sowings of the dry crops are, therefore extended upto August—September. Concomitant with this, the moths emerge later and the pest is encountered in alarming proportions by August—October.

3. *Pollachi (Coimbatore District)*: This tract presents certain peculiar features. Previously, groundnut was being sown by May and the pest noted by June. The sowings of late, have been advanced by about a month taking advantage of the earlier showers. The seeds are generally sown by April and the moths of *Amsacta* emerge with these sowing rains and the caterpillars are rampant during May—June. A more important point to be stressed here is that, unlike the other tracts the sowing rains are received in the form of intermittent mild showers and the weather also is very mild. The celubrious climate, coupled with the continuous drizzles, practically eliminate the natural destruction of the egg-masses by the sun, as it happens in other tracts. Incidentally, the very same factors

also encourage the rank growth of wild vegetation on the bunds, fence and waste lands near about. The moths readily seek shelter amidst these weeds and lay their eggs on them. The larvae, on hatching, feed freely on a variety of weeds like *Commelina benghalensis*, *Rhynchosia minima*, *Portulaca* sp. as well as on a number of grasses like *Chloris barbata*, *Pennisetum* sp. etc., until such time the groundnut crop grows up when they transfer their activities to the standing crop in the field.

Some interesting habits: Even when the caterpillars enter the groundnut field they first attack the cowpea plants which are sown in lines with groundnut and take to the latter after the plants are about three weeks old. This observation is in conformity with the common belief among the cultivators of this tract that the red hairy caterpillars do not feed on very young groundnut plants. They breed freely on young cholam, reducing the leaves to papery structures and if the crop is young it is completely destroyed and resowing will have to be done. That freshly-hatched red hairy caterpillars freely breed on crops other than groundnut has been observed by Sri S. Ramachandran (1950) and Kundam and Patel (1956), in Punganur (now in Andhra State) and Bombay areas respectively. In Punganur moths that emerge after the rain have been observed to lay their eggs on the soil, weeds etc., and the young caterpillars that hatch out infest the tender germinating *ragi* crop, cotton etc., and cause considerable damage to these crops rather than to the groundnut crop. In Bombay, the moths have been noted to lay their eggs on hedge plants and the young caterpillars that hatch feed on these hedge plants. However later on when the cultivated crops have germinated, they migrate to the field and become full grown.

Yet another interesting fact in Pollachi area is the severity of the second wave of the caterpillars. Heavy emergences of moths, evidently from the short cycle larvae, take place after the North-east monsoon and the caterpillars cause serious havoc to horsegram, cotton etc., which are grown by about that period.

It has to be admitted that the mention of the second wave of the emergences from the short cycle larve is based on some cursory observations made by the workers on this field some years ago and this has to be confirmed by detailed study.

One more interesting fact about the feeding habits of *Amsacta* is that fields which have had a heavy emergence of the moths, escape severe damage as also observed by Ramachandran (1950). The adults

do lay their egg-masses in plenty on the standing crop. The caterpillars, on hatching, just scrape the leaves and feed on them for a few days, without any serious harm to the plants. They assume the more serious feeding phase about a fortnight later, by which time they completely desert the original field and march off in their millions to the neighbouring areas.

Control: The latest method of control evolved to tackle the pest, in its most vulnerable stage, is to give a liberal dusting of BHC 10% a week after each emergence. The principle envisaged is that the caterpillars would have just hatched out and would be in their gregarious feeding phase for three or four days and that a timely application of the insecticides would annihilate the pest in its young caterpillar stage before it would cause any damage. The fact that a large number of the caterpillars concentrate on the bunds and waste lands under conditions as are prevalent in the Pollachi area, may also be taken advantage of to control the pest effectively and economically by treating these areas also.

Control of grown up caterpillars with other insecticides like Toxaphene 20% dust and parathion is also possible but they are very costly compared to the BHC 10% treatment.

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Cultivation of Unirrigated Cambodia Cotton in Madras State

by

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Introduction: Out of the total area of about 5,29,900 acres under Madras Americans in the state during 1956—'57, the rainfed Cambodia accounted for 2,51,500 acres. Cambodia cotton is cultivated under rainfed conditions mostly in the districts of Coimbatore, Salem, Tiruchirappalli and Madurai where early North East monsoon rains are received. The average yield of the Unirrigated Cambodia raised in the tract is about 40—80 lb. of lint per acre.

The success of the rainfed Cambodia crop is mainly dependent on the distribution of rainfall during crop growth and other seasonal conditions. Apart from the weather conditions, which are of course beyond our control, there are ways of getting a good crop adopting suitable cultivation practices which are discussed below.

Preparatory cultivation: This operation is important to the successful growth of the crop after sowing. Four to five ploughings are given right from April—May onwards to bring about good tilth of the soil. Frequent exposure of sub-soil facilitates the killing of grubs, pupae of pests and drying of roots of weeds by hot sun.

Manures and Manuring: Generally ryots do not manure the rainfed cotton crop. In some places, fields are manured with cattle manure at 10 cart loads per acre if there is transport facilities or with sheep penning (1000 sheep per acre). The unirrigated cotton crop responds well to about 40 lb of nitrogen per acre as an economic dose and of this, 20 lb. of nitrogen can be supplied easily by the application of 100 lb. of ammonium sulphate per acre. The remaining 20 lb. of nitrogen can be met by the application of organic manures like Farm yard manure, compost or sheep penning. The manure should be distributed in the field uniformly and covered with a plough before sowing. The working of Guntaka facilities the breaking of clods and levelling up the surface which forms the final stage of preparatory cultivation.

Seeds and Sowing: The ryots do not take pains in the selection of seeds and sowing methods. They invariably buy seeds of the unselected bulk which is a mixture of different types of inferior

quality cottons. Generally seeds are broadcasted and covered with country plough or dibbled behind country plough or hand dibbled using higher seed rate of 20 to 25 lb. per acre. In these methods the seeds are not evenly distributed both on the surface as well as inside the soil, which leads to uneven and poor stand. Dibbling behind plough is preferable to other two methods as there will be some space between rows atleast.

The above defects can be got over by the use of good pedigree seeds supplied by the Agricultural Department. The seeds are to be treated with Agrosan (1 oz. for 20 lb. of seeds) to check the primary infection of blackarm borne by the seeds. On receipt of soaking rains, lines are to be drawn at 2' apart with the aid of Gorru or country plough and seeds dibbled 9" apart in the lines. Two to four seeds per hole are to be sown in order to obtain a good stand in the beginning itself since the performance of plants from the gap filled seeds are poor. These are latter thinned to one plant per hole. About 10 to 15 lb. of seeds will be required for an acre. The advantages of giving proper spacing are (i) uniformly distributed population (ii) after cultivation and harvest easier and economical (iii) good aeration is provided and the shedding due to congestion is reduced and (iv) closer spacing results in higher yields.

After cultivation: About six weeks after sowing when the seedlings have put forth 4 to 5 leaves one hoeing and weeding is given with hand hoes or mummutti. Then leaving one healthy and vigorous seedling per hole, the weak and sick ones are pulled out which facilitates good development of plants. When the crop is about 45 to 50 days old, one inter cultivation with Guntaka or Junior hoe is given which is economic and quick and which aids in the removal of weeds, conserves soil moisture, facilitates good aeration of soil and stimulates growth. The weeds at the base of plants can be hand-weeded. Any deeper cultivation in flowering period or later will lead to the heavy shedding of flowers.

Plant Protection: Insect pests like surface weevil, jassids, grass hoppers, bud worm, leaf-eating caterpillars, boll worms leaf rollers, red cotton bugs and stem weevil and diseases like blackarm and Alternaria Sp. are generally found in cotton crop. Stem weevil and Boll-worms continuously damage the crop and since they remain inside the plant parts are not easily controlled. The continuous cloudy weather with dew and intermittent drizzle in October to December facilitates the multiplication of the pests and diseases. Spraying or

dusting is to be done in the morning hours and the lower surface of leaves should also be covered with pesticides to kill jassids, aphids, thrips and red spider. The pests occurring at various stages of crop growth and the control measures are given below in detail.

<i>Crop stage</i>	<i>Pesticide recommended</i>	<i>Dosage</i>	<i>Pests that are controlled or reduced</i>
Sowing to bud formation	Cotton dust	6 lb. per acre	Jassid, Aphid, bud worm, grass hoppers, leaf eating caterpillars etc.
Bud to flowering	Cotton dust or Endrin	6 to 10 lb. per acre (1 oz. in 6 gallons of water)	Jasid, leaf eating caterpillars, boll worm.
Boll period	Cotton dust or Folidol	10 lb. per acre (1 oz. in 12½ gal. of water)	Boll worm, red cotton bugs, caterpillars damaging bolls etc.

(Stem weevil can be controlled by the application of soil insecticide or by pulling out the affected plants and destroying the pest). The primary infection of blackarm is checked by treating seeds with Agrosan. It is very essential to guard the plants against pests and diseases so as to make them healthy and enable them to utilise entire food resources for production of bolls.

Harvest: The crop comes to harvest by February 1st week i. e. 110 to 120 days after sowing. *Ryots* collect kapas on alternate days and kapas from immature and unripe bolls are also collected along with good kapas.

Kapas are to be controlled in the morning hours so that they can be free from dried bracts and leaves and from well opened bolls. Hard, stained and immature kapas are to be collected separately.

Yield: The ryots obtain about 250 lb of kapas at the most with their usual methods from an acre. By adopting the above suggested improvements, about 500 lb of kapas per acre can be obtained. The cost of cultivation and profit per acre in both the methods are given below.

Particulars	Local method	Improved method	Increase due to improved methods.
	Rs.	Rs.	Rs.
Expenditure	65	111	46
Gross income	104	201	104
Net profit	39	97	58

It can be seen from the above data that by spending about Rs. 46 over and above the local method of cultivation, the ryot can gain an additional amount of Rs. 58/- as profit.

If there are good summer showers in April, there is possibility of getting one more flush in June. One intercultivation with Guntaka (blade harrow) will favour better performance. Ryots do not give such intercultivation. Now the economics of cultivation per acre in both the methods are as below.

Particulars	Local method	Improved method	Increase due to improved method
	Rs.	Rs.	Rs.
Expenditure			
Season	65	111	
Summer	9	12	
Total	74	123	49
Gross Income			
Season	104	208	
Summer	30	74	
Total	134	282	148
Net Profit	60	159	99

It would be seen from the above table that by incurring an additional expenditure of Rs. 49 the ryot can get a net profit of Rs. 99 per acre over and above what he would ordinarily get in the cultivation of dry cotton.

The Influence of Indian Cattle in the United States of America

by

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It has long been known that there are many cattle of Indian origin in the United States of America, but, details as to their importation, breeding methods, new types evolved etc., have not been generally available in the land of their origin and this note is an attempt to rectify the defect.

Indian cattle are generally referred to, in the United States, as "Brahman" cattle, a term which originated from an American misconception that Sradh or "Brahmini" bulls constituted a distinct breed, and this term is now recognised by the U. S. Department of Agriculture as a term to describe cattle of Indian Origin which have been selectively bred in the United States for beef purposes. They are also known as "Zebu" cattle, a term more commonly understood as a reference to Indian cattle in other parts of the hemisphere, especially Brazil. The Brahman breed is mainly the result of the influence of three of the major Indian breeds, the Kankrej, the Ongole, and the Gir, although other Indian breeds have also been used in its formation, especially Krishna Valley, Hissar - Hansi, Amritmahal, Scindhi, and possibly Malvi, Nagori and Haryana.

Importation: The first Indian cattle, to be brought to the shores of the United States of which there is definite record, were a Nagori bull and a Gir cow imported by Dr. James Bolton Davis into South Carolina in 1849. These animals were obtained by Dr. Davis in exchange for a pair of Angora goats, from England, where they had been brought for exhibition from India. This importation was dispersed before the American Civil War, but other small importations, mainly of bulls, soon followed, and these interested the cattlemen of the Gulf Coast region in exploring the possibilities inherent in these cattle.

The area along the Texas Gulf Coast between Houston and Corpus Christi had been an area most receptive to "Brahman" cattle, and this interest began with a crossbred bull, out of a white Short-horn cow, whose calves, by their superiority over the existing cattle of the area, converted cattlemen to this new type of breeding stock.

Some of these cattle were purchased by Captain M. Kennedy for his Laureles ranch, and he also purchased crossbreds from Louisiana to upgrade his stock. Similar stock were also acquired by other breeders notably J. A. McFadden and his son AL. McFadden, A. H. "Shanghai" Pierce, J. M. Frost and Albert Montgomery. These men established important foundation herds, and in 1906, the Pierce Estate, in partnership with Tom O'Connor of Victoria, made one of the largest and most important influence for the establishment of Indian cattle in the United States.

Indian cattle had previously been exported to Brazil, where the "Triangulo Menirio" area of Minasgerais province became the focal point of Indian cattle breeding. Cattle sent from Brazil to Mexico and descended from these importations, were imported into the United States in 1924 and 1925. These cattle went mainly to existing Brahman cattle ranches, and did much to upgrade and augment the existing Brahman cattle of Texas and the Gulf Coast States.

The only subsequent importations have been one of bulls of Brazilian origin from Mexico in 1946 by a group of South Texas breeders, and importation of four Red Sindhi cattle by the U. S. Government the same year from the Allahabad Agricultural Institute.

Breeding Methods used in Development: The breeding methods used in the development of the American Brahman have been generally extensive, most breeders have had at least 50 cows and one or two bulls in their breeding herds, while major breeders have always maintained much larger numbers, and have therefore been better able to maintain more intensive selection. Significantly the majority of breeding bulls have come from the herds of the larger breeders. In the creation of new breeds, such as the *Santa Gertrudis* on the King ranch, thousands of cattle have been raised and selection has been most intensive, while resources of finance, and talent from the U. S. Department of Agriculture and Texas A. and M. college have also been liberally tapped. Breeds have also been developed by private breeders such as the Charbray (Brahman x Charollais—a French breed) developed mainly by Harl Thomas and the late Fred Turner of South Texas, and the Beefmaster, developed by the Lasater family of Falfurrias, Texas.

Creation of New Breeds and Strains: *The Santa Gertrudis Breed:* One of the largest, most prosperous, and almost fantastic ranches of Texas has been the King Ranch of South Texas. Established by

Captain Richard King in the middle of the last century, it is still managed by his descendants, and recently celebrated the centuary of its existence and development. Besides developing a breed of cattle, it has also developed its own strains of Quatar horses and through-breds, and has conducted extensive experiments with equipment for brush eradication.

The first cattle of the King Ranch were Texas Longhorns, decendents of the cattle of the Spanish colonists, and inured to brush and tick infested country by natural selection. However, they were poor in beef type and conformation, and so, were graded to pure-bred Hereford and short-horns bulls when these became available to the Western ranchers, towards the close of the last century. While these proved superior in market conformation, they were not satisfactory under ranch conditions, especially during the summer months, when they suffered from high temperatures of South Texas.

About 1910, Tom O'Connor of Victoria gave a black bull, a Brahman short horn first cross, to the King Ranch. This bull, was used for breeding, but out of male off-spring only a red bull calf "Chemera" was saved. His daughters, bred to short-horn bulls, proved highly satisfactory, and descendants of both the O'Connor bull and Chemera became the best range cattle on the King Ranch, as they developed into big boned, well fleshed cattle on grass pastures alone. The success of these animals led to a cross-breeding programme with 52 Grade Brahman bulls purchased from the Pierce Estate in 1918 and in 1919, one of these bulls, named "Vinotero" was bred to a cow of one-sixteenth Brahman blood, a descendant of the O'Connor bull through Chemera. The Produce of this union, in 1920, was the celebrated red bull "Monkey", who not only proved to be the best individual range bull and a prepotent sire but who was also destined in time to be the sire of the *Santa Gertrudis* breed.

Since Monkey was the most satisfactory individual developed on the King Ranch up to that time, a programme of close inbreeding to him and his sons, was then commenced. Monkey gave rise to over 150 useful sons, and died in 1932. He and his best sons were placed in single sire herds, his other sons, and later his grandsons, were placed in multiple sire herds. In this way the entire King Ranch herd was soon strongly related to this desirable bull. His male descendants were used to grade up the cross-bred Brahman shorthorn foundation. This breed building programme was carried out simultaneously with the normal commercial livestock operations of

the ranch, herds of "first cross" and "double cross" cows being bred to similarly bred bulls in operations involving thousands of cattle. Soon, the distinct type of the *Santa Gertrudis* breed, with uniform and distinct characters and a dark solid red coat, similar to that of *Red Sindhi*, developed in the King Ranch herds.

In 1940, the *Santa Gertrudis* breed was officially recognised by the United States Government as a new breed of beef cattle. The breed took its name from the Santa Gertrudis Land Grant, originally conferred by the Spanish Crown, on which the headquarters of King Ranch are now located. From the arrival of the O'Connor bull to its recognition as a breed was just thirty years, one of the most rapid developments in the formation of modern breeds of livestock.

In 1951, the *Santa Gertrudis* Breeders International, the official association for the registration of *Santa Gertrudis* cattle was formed at Kingsville with 166 charter members. The previous year, the King Ranch had the first of its now annual auctions, and animals of this breed are now found in many of the other States, as well as in Cuba, Colombia, Mexico, Hawaii, Australia, Brazil, U. S. S. R., and fifteen other countries. Registration is contingent on satisfaction of pedigree and inspection requirements, animals satisfying these requirements being classed either as certified or accredited. Produce even of already registered stock is still subject to inspection before registration. This is indicative of the high level of effort still being continued to improve the breed to greater excellence. The classification of breeder's herds is done by specially trained, paid employees of the association with full authority, rather than by a committee of breeders, as is usual with many associations. Certified pure bred animals are branded after inspection with the letter "S" while accredited (females only) are branded "S bar", in the presence of the official classifier, who follows the official standard of excellence, which describes "desirable", "permissible", "objectionable" and "disqualification" features for registration. As the breed is still developing, registration of superior animals from accredited stock is still permissible, i. e., the registry may be described as open.

The composition of the *Santa Gertrudis* breed of today is about three-eighths Brahman and five-eighths Shorthorn, this being considered the most satisfactory combination for tropical beef production in the breed.

The Charbray breed: The *Charbray* is a cross of the French Charolaise or Charollaise breed with the Brahman, and animals acceptable for registry "must have at least one-eighth Brahman, or not more than one-fourth Brahman to qualify for registration" in the American Charbray Breeders Association which was established in May 1949 at Weslaco, Texas.

The breed was mainly developed by Harl Thomas and Freed Turner of Weslaco, who crossed registered Brahman cows with Charolaise bulls to produce $\frac{1}{2}$ Charolaise $\frac{1}{2}$ Brahman cows. These cows were bred to other Charolaise bulls and their offspring registered as *Charbray*. The $\frac{3}{4}$ Charolaise and $\frac{1}{4}$ Brahman cows were also bred to Charolaise bulls to produce $\frac{7}{8}$ Charolaise— $\frac{1}{8}$ Brahman cattle, and these animals were also registered as *Charbray*. The registry, like that of the *Santa Gertrudis* breed, is still open to acceptable animals of superior conformation.

This breed has only been developed in relatively recent years, and so, breeders are still working out a suitably standardized type, but are agreed in that they are striving for a large beef-type animal "that is an excellent grazer, a fast breeder and is easy to handle". Grown cows weigh from 1700 to 2200 pounds and grown bulls from 2500 to 3200 pounds, the usual dressing percentage is from 60 to 65 percent. *Charbray* calves are usually born a light tan which bleaches out to a cream white in a few weeks. They have rapid growth and have been desired as veal calves, as they usually weigh 90 to 125 pounds more at weaning time than other beef breeds.

Charbray cattle have crossed well with other breeds and are now found in twenty six states of the U. S. A., Hawaii and five Latin American countries. Breeders are continuing their efforts in intensive breeding programme for raising the excellence of this breed to greater heights.

The Brangus breed: As the name implies, the *Brangus* is the result of a cross of the Brahman with the Aberdeen—Angus breed of Scotland. *Brangus* are large black, hornless animals of about three-eighths Brahman and five-eighths Angus in their constitution, and may be produced either by crossing "quarter blood" individuals with "half bloods", or by crossing a three-quarter Brahman with a purebred Angus. *Brangus* are then being bred to *Brangus* to develop the breed and fix the desirable characteristics of this cross. The American Brangus Breeders Association was

organised at Vinita Oklahoma on July 29, 1949 with 51 charter members, and now has members in thirty eight states, Canada, Mexico, Venezuela, Cuba and other foreign countries. The breed association has as its purpose, the further development of *Brangus* cattle, and both registers of *Brangus* cattle meeting the conformation requirements of the Association as well as records of foundation stock being used in development of *Brangus* cattle. Clear Creek Ranch owned by Buttram and Son of Oklahoma city, Oklahoma, and Clear View Ranch owned by Rammond Pope of Vinita Oklahoma, are among the foundation establishments of the breed.

The Beefmaster breed: The *Beefmaster* breed was developed at the Lasater Ranches at Falfurrias, Texas, and Matheson, Colorado, and has been now recognised as a new beef breed by the U. S. Department of Agriculture.

The breeding programme to develop the breed was begun in 1908, when the Texas Ranch became the first in its area to experiment in the cross breeding of the Brahman cattle. Emphasis was placed on the development of a breed which would produce a quick maturing heavy calf at eight months of age under range conditions with no supplemental feeding. It is also a rigid rule of the Lasater breeding herds that all *Beefmaster* females, beginning as two year olds, must drop, raise and wean an early calf each year or be dropped from the breeding herd. The *Beefmaster* has been developed from Brahman—Shorthorn—Hereford crosses, and while it is estimated that it contains about 50% Brahman "blood" the developers of the breed have not tried to use any particular level of blood as their objective, but have simply retained the best animals for breeding on the basis of disposition, fertility, weight, conformation, thriftiness and milk production. All animals not displaying these six characteristics are culled, regardless of other factors.

There is no herd registry on *Beefmasters*, however, the name is copyrighted, and its use is authorised under a name franchise contract issued to breeders who purchase stock from the Lasater herds. *Beefmasters* are marked under a somewhat unique system known as "The Beefmaster Plan" with selection and delivery based on postmark priority of contract.

Braford animals have good size and are well fleshed, but the registry association for this cross, the North American Braford Breeders Association, formed in 1948 at Bay City, Texas, is currently inactive as many of the breeders of this cross are commercial beef producers, and are content to use this cross for commercial production without trying to stabilize a definite type into the breed.

Braford cattle are found in the fairly large herds maintained by the Paddock Ranch Co., of Houston, Texas, and Savage and Sons of Bay City, Texas. Messrs. Coon and Culberson of Dalhart, Texas have also used this cross extensively in the past, the name "*Braford*" is believed to have been originated by Mr. Coon. Savage and Sons have bred *Braford* cattle for twenty five years, securing foundation Brahman bulls from the Pierce Estate and using Hereford cattle of Prince Domino breeding. They have emphasized quality and conformation rather than any color, and have tried to maintain a combination of half Brahman and half Hereford which they consider as being most satisfactory.

The Brahman breed: Last, but not the least, may be considered the *Brahman* breed. The various breeds of India that have been imported into the United States have not been kept separate, but have rather been crossed with each other and the results selected for a beef type. This was both due to the scarcity of imported females needed to keep the Indian breeds pure, and also because most of the early importations were bulls of various different breeds. About 270 cattle of both sexes have contributed to the *Brahman* breed. The Indian breeds predominating in the *Brahman* of today are mainly the *Kankrej*, the *Ongole*, and the *Gir*. Considerable progress has been made in selection for a beef type and many of the large ranches now have herds of considerable uniformity, but breeders are endeavouring to develop still better types by continued intensive breeding policies. A difference of ideals in breeding policies has led to two associations for the registry of *Brahman* cattle. The American Brahman Breeders Association established in 1924, with headquarters in Houston, Texas, and the Pan American Zebu Association, established in 1948, and now in San Antonio, Texas. The two associations have registered, by 1955, more than a quarter of a million cattle, making the *Brahman*, after the *Hereford*, *Angus*, and *Shorthorn*, the fourth largest beef breed in the United States. Registered *Brahman* cattle are now being bred in 40 states and 33 foreign countries, including Australia, Israel,

Madagascar, Rhodesia, East Africa, Philippines, Thailand, New Guiana, as well as most of the countries, of Central and South America. Transfers of *Brahman* cattle ownership in the registry association have shown a steadily increasing percentage to foreign ownership, indicating a growing export trade.

Both registry associations are open, and, besides descendants of already registered animals, approved females, of suitable conformation and at least 31/32 Brahman breeding, as well as animals of Indian breeds imported from Brazil or India may also be registered. However, animals from India or Brazil are not being imported at the present time as they are in areas which have diseases not found in the United States, and import regulations forbid any importations from such areas.

Besides the registry associations, there are a number of affiliated regional associations, which help in publishing *Brahman* cattle and aid in sponsoring local exhibitions and shows. There are also major show circuits for *Brahman* cattle in Texas, Florida, and Louisiana, and of all the shows, the San Antonio show, with nearly 200 Brahman cattle exhibited, is perhaps the largest. The large breeders are the principal exhibitors, due to the not inconsiderable expense of showing cattle on a show circuit. Enthusiasm for the breed is also stimulated through breed literature, Photographs, films, and models of desirable type Brahman cattle, and breed magazines, which give news of breeders, their cattle, result of shows and other pertinent information. Breeders and animals of note are often also interviewed or featured by daily newspapers and national magazines, the resultant publicity serving to popularize the breed.

Brahman cattle herds are also being maintained by educational institutions, and of these, and herds of Texas A. and M. College at College Station, Texas and Louisiana State University at Baton Rouge, Louisiana are particularly noteworthy. Experiments involving *Brahman* cattle are being conducted by many of the agricultural colleges of the Gulf Coast States, as well as the U. S. Department of Agriculture.

Conclusion: *Brahman* cattle are now firmly entrenched in the United States, and have proved their ability to contribute to the animal husbandry of America and other countries lying in the tropical regions of the Western hemisphere. The new breeds created with the use of the Brahman influence are an indication of the tremendous

possibilities latent in these cattle, and the success that can attend their careful development. Many of our pure Indian breeds, with similar attention to selection and development can surely achieve the same uniformity and perhaps much greater excellence in the land to which they are native, and in which already exist, several individual animals of great merit.

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FIELD RAT TROUBLE

Control Operations

Field rats cause damage to crops in many areas. Using poison baits is now being widely recommended as a good method of controlling them.

The baits made with three per cent zinc phosphide (by weight) mixed in 97 per cent (by weight) of a carrier like crushed jowar, (cholan) maize, gram, wheat or barley and a just sufficient quantity of any vegetable oil to make the mixture slightly greasy.

The carrier is soaked in water for 15 minutes. Then it is drained, airdried and mixed with zinc phosphide. A chhatak of any cheap vegetable oil like sarson, til, or groundnut oil for every five seers of bait is added. The addition of the oil makes the bait attractive to the rats.

The first thing to do is to locate all rat burrows in the fields and close them. Those which are found open on the following day should be baited. An ounce or half a chhatak of the bait rolled in paper should be inserted two to three inches inside the burrow. After the bait has been introduced, the burrow should be closed. If found necessary, the burrows should be baited again on the third day.

Rats also destroy stored farm produce and other household articles. Poison baits can be used to control rats in households too.

Since the bait is poisonous to human beings, cattle and poultry, every care should be taken to keep people or cattle or poultry from having access to it in the field or in the home. It is a good precaution to use hand-gloves for preparing the bait or handling the same.

Good results would be obtained if the rat control is conducted after sowings as well.

[Release No. F. I. O. 4/58.]

Madras agric. J., 45 (12) : 469-470, 1958

Research Note

Soil moisture and growth of cholam Co. 1

It is not uncommon to see uneven stand of a crop in a field due to the heterogeneity of the soil. This is especially marked in dry lands, where local variations in soil-moisture limit the growth of the crop in the different patches. The stand of the crop differs from field to field depending upon the moisture retentivity and fertility of the soil.

In the 1958 season, Co. 1 cholam was sown in Field numbers 36-A and 56, Central Farm, Coimbatore, on 14-7-'58 and 13-7-'58 respectively. The soil in field number 36-A is black and clayey, while that in field number 56 is red and loamy. A spell of dry weather continued to prevail for 33 days from 8-8-'58, except for very light drizzles. This affected the crop adversely in both the areas and the crop withered, but yet in a few small patches the crop continued to be green and fairly healthy. This difference in stand in this period of drought can only be due to the difference in soil-moisture and the nature of root development in the different places. In order to see how far the variations of soil-moisture contribute to the variations in the stand of the crop, soil-moisture estimations were done at four places in each field, where the differences in the stand of the crop were conspicuously marked. The heights of the six plants around the soil sampling area were recorded, and the length and spread of roots of the same were measured. The percentages of soil-moisture at the zones 0"-3", 3"-6", and 6"-12" depths at the four places along with the means of the height of plants, length of roots and spread of roots in the fields 36-A and 56 are presented in tables I and II, respectively.

In locality I in the black-soil area (Field No. 36-A) the plants were stunted and almost dried up, even though the percentage of soil-moisture in the 6"-12" zone was 15.86, because the root system has not penetrated even to a depth of 6". The cause for the meagre root development may be due to the effect of the avenue trees on the road, about 30 feet away from this area. The plants in locality IV were still vigorous, in spite of drought, due to favourable soil-moisture conditions. The percentages of soil-moisture at locality IV indicate the probable minimum soil-moisture that is required for crop-growth under black-soil conditions at Coimbatore.

In the red-soil area (Field No. 56) the percentage of soil-moisture at 6"-12" zone at locality IV is still lower than that at the localities II and III, where the plants were partly drying up. But yet the plants were green and vigorous due to the wider root-spread. The percentages of soil-moisture at this place may be taken as the indicator of the minimum levels of soil-moisture required to prevent the crop from wilting under the red-soil conditions.

It was noticed in both the fields, that the depth of penetration of roots into the soil has not exceeded 12". This may be taken as an indication that, under irrigated conditions, it is enough if the top 12" of soil is wetted for the proper growth of cholam Co. 1. An intensive study of the causes for the variations of root development of the same crop in the different localities in the same field may be able to throw much light on the moisture needs of crop.

Agricultural Meteorology }
Section, Agrl. College &
Res. Inst., Coimbatore. }

M. V. JAYARAMAN,
C. BALASUBRAMANIAN.

TABLE I
Black Soil Area: Field No. 36 - A
Percentages of Soil-moisture at different places and
growth of Cholam Co. 1

S. No.	Locality	Percentage of soil-moisture at			Growth of Cholam Co. 1			Remarks
		0"—3"	3"—6"	6"—12"	Ht. in cms.	Root length in cms.	Root spread in cms.	
1	I	7.22	8.72	15.86	7.7	13.5	9.5	Plants small; and almost dry.
2	II	3.95	8.06	10.82	21.9	38.0	15.0	Short plants with leaves $\frac{1}{3}$ to $\frac{1}{2}$ dried up.
3	III	5.70	9.98	9.03	17.5	24.0	20.0	Short plants with leaves half dried up.
4	IV	7.01	12.31	14.53	64.4	25.0	25.0	Green vigorous plants.

TABLE II
Black Soil Area: Field No. 56
Percentage of Soil-moisture at different depths and
growth of Cholam Co. 1

S. No.	Locality	Percentage of soil-moisture at			Growth of Cholam Co. 1			Remarks
		0"—3"	3"—6"	6"—12"	Ht. in cms.	Root length in cms.	Root spread in cms.	
1	I	2.99	5.08	7.52	8.4	11.0	5.5	Plants small; mostly dried up.
2	II	4.19	6.99	10.68	17.4	28.0	20.0	Plants with leaves $\frac{1}{3}$ to $\frac{1}{2}$ dried up.
3	III	4.64	7.30	10.19	38.5	27.0	20.0	Plants with leaves half dried up.
4	IV	4.95	7.89	9.51	71.7	31.0	22.0	Plants are green and vigorous.

A New Species of Oryza, L.

In the course of a search for the species of Oryza, a form was collected from Emurbhagavati hills of Kerala State, near Malampuzha reservoir and subsequently from Topslip of Anamalai Hill ranges, Madras State. This has somewhat, a restricted distribution. The specimen on examination was found to be a tetraploid¹ ($2n=48$) and comparison with other species showed that it did not fully agree with the characteristics of any recorded species of India. In the following is given a description of this new species.

Oryza malampuzhaensis Krishnaswamy & Chandrasekharan, spec. Nov.

Plantae perennes, rhizomaticae, usque ad 160 cm. altae; foliorum laminae lineares, lanceolatae, 39—53 cm. longae, l. 2—1.7 cm. latae, ligula inferiorum foliorum brevi 3 mm. lata ad apicem ornata fimbria capillorum tenuium; paniculae bene exsertae (peduncula 43 cm. longo), inflorescentiae axi tenuiter lanuginoso-pubescenti ad punctum originis ramorum, ad caeteras partes scabrido; paniculae laxae, ca. 28 cm. longae, ramis patentibus, spiculis late oblongis, deciduis, 5—6 mm. longis et 2.5—3.0 mm. latis, aristatis, aristis l. 3—3.6 mm. longis, deciduis. Lemna sterile acutum, distincte brevius lemnate fertili, l. 5—2 mm. longum; fertile lemma longe setaceum ad carinam et costas, sparse setaceum per superficiem. Speculae maturae nigrae. Grana brunnello-alba.

Typus lectus ad margines rivorum et rivulorum in silvis a Topslip in collibus Anamalaianis in Statu Madras ad 2,000 pedes altit. et in collibus Emurbhagavathi prope Malampuzha lacum in Statu Kerala ad 500 pedes altit.

Oryza malampuzhaensis Krishnaswamy & Chandrasekharan, spec. Nov.

Plants perennial, rhizomatous, vigorous growing 160 cms. tall; leaf blades linear lanceolate 39 to 53 cms. long, 1.2 to 1.7 cms. wide ligule of lower leaves short 3 mm wide, with a fringe of fine hairs at the apex; panicles well exserted (length of peduncle 43 cms.) axis of inflorescence slightly wooly pubescent at the origin of branches the rest scabrid; panicles loose about 28 cms. long, branches, spreading, spikelets broadly oblong, deciduous, 5—6 mm. long and 2.5 to 3.0 mm. wide, awned, awns 1.3 to 3.6 mm. in length, deciduous. Sterile lemma acute considerably shorter than the fertile lemma, 1.5 to 2.0 mm. long, fertile lemma along the keel and ribs long bristled, sparsely bristled over surface. Mature spikelets black coloured. Rice brownish white.

The plants have been found growing on margins of forest rivers and rivulets in Topslip of Anamalai hills (Madras State, elevation 2000 ft.) Emurbhagavathi hills near Malampuzha reservoir (Kerala State - elevation 500 ft.)

Type No. C. G. I, deposited in the Herbarium, Regional Botanical Survey, Southern Circle, Coimbatore.

Acknowledgment: We are grateful to Fr. Santapan, St. Xavier's College, Bomby, for the latin rendering of the description of the plant.

N. KRISHNASWAMY,
P. CHANDRASEKHARAN.

1 Krishnaswamy, N and P. Chandrasekharan. 1957:
Note on a naturally occurring tetraploid species of *oryza*.
Sci. & Cult. 23: p. 307—310.

HIGH YIELD OF QUALITY TOBACCO

Improved cultural methods followed

How a few, simple improved methods of cultivation can produce excellent results with flue-cured tobacco crop were demonstrated the other day at the Central Tobacco Research Institute at Rajahmundry (Andhra Pradesh).

By adopting the improved cultural methods in one of the demonstration plots, the yield of cured leaf was found to be as high as 1,542 pounds, of which 66 percent was bright-grade leaf. The leaf size was found to be as much as 32 inches x 22 inches, the leaf having very good quality, texture and body.

The improved methods adopted were: deep cultivation in summer, using composted tobacco stalks as manure, deep placement of fertilizers and mulching the crop with paddy straw.

Farmers can also raise similar crops of flue-cured tobacco. They can give the fields the deep cultivation in the summer months either with a tractor when available, or by hand-digging. Tobacco stalks can be easily composted before the moonsoon after crushing them under a roller or a cart. The compost can be spread in the fields in July (three months before planting).

With a simple bullock-drawn implement evolved at the Institute, they can fertilize deep. Mulching can be done with either paddy straw or any other cheap stuff like twigs or grass after the first interculturing, about three weeks after planting.

[Release No. F. I. U. 8/58]

Madras agric. J., 45 : (12) 473—475, 1958

Nucleus method of queen introduction

The queen is the most important individual in a bee colony. The continuity and prosperity of the colony depends on her fecundity and the nature and capacity of the workers she is breeding. If the queen is prolific and the workers active, the colony will be prosperous as it is well populated with workers of different age-groups to attend to the different needs of the colony. If the colony is not prosperous inspite of the favourable weather and pasturage conditions, the reigning queen is to be discarded and a queen with a record of better performance is to be introduced for upgrading such colonies. Occasionally the reigning queen in a colony may be lost or missed accidentally. Such queenless colonies too may be kept up and improved by the introduction of queens having desired traits. Thus in an Apiary there may be occasions when it may be necessary to introduce queens either for upgrading colonies or for keeping up colonies that have lost their laying queens.

Successful queen introductions need perfection and careful manipulations. Every colony has its own distinct hive odour by which the members of a colony recognise each other and spot out individuals from other colonies that have strayed in accidentally. Such strange bees are chased and driven out of the hive, especially during the lean seasons when they stray in without either loads of pollen or nectar. Hence before introducing a queen it is necessary either to mask the hive odour of the introduced queen and its followers or to protect her from being balled out.

One way of masking the hive odour of the queen that is to be introduced is by dipping her in honey and leaving her on the top of brood frame of the colony in which she is to be introduced. The workers are attracted by the honey covering the queen and gather around her and lick the honey greedily. When introduced in this way the odour of the introduced queen is not noticed and the queen is accepted in most of the cases.

Queen introduction is also achieved by the "cage method". The queen to be introduced is enclosed in a fine wire gauze cage with sufficient space inside for the queen and the accompanying workers to move about. This cage is left inside the hive on the top of the brood frame. By this the workers of the queenless colony are able to contact the queen inside, but cannot bale out the queen. In the course of twenty four hours or so, the hive odour of the introduced queen, and that of the queenless colony become similar. The next day the queen is released from the cage and she is accepted.

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Another method is the "smoke method". The queenless colony is smoked and in the midst of the confusion the queen to be introduced is let in through the hive entrance. When the colony calms down after a few minutes the queen is accepted.

In the College Apiary at Coimbatore the usual method adopted for introducing a queen is by dipping the queen in honey and leaving it over the top of the brood frames. In this method a number of good queens were lost. Hence a more reliable method of introducing a queen with a greater degree of success had to be devised.

The workers of a colony are very much attached to their queen. They even sacrifice themselves to protect the queen from her enemies and in times of food shortage, she would be the last to die of starvation. This attachment of the workers to their queen is exploited and made use of, in a few trials. The queen was introduced in a queenless colony in its own frame having broods eggs and grubs and with the adhering workers. The queens so introduced were accepted readily. The only precaution to be taken before putting on the roof of the hive, after introduction of the queen is that the brood frames must be arranged properly so that only a bee's space is left between the adjacent frames for a worker to move on the sides of the frames. In this way the chances of crowding of workers on a side and thus balling the introduced queen are minimised.

Before attempting introduction, the queenless condition of the colony in which the queen was to be introduced, was established or in a normal colony, the laying queen was removed. In the case of introduction by dipping the queen in honey a minimum period of 24 hours of queenlessness of the colony was maintained. In the "nucleus method" the period of queenlessness varied. In some cases the new queen was introduced just after the removal of the laying queen. One of the end brood frames in the queenless colony or dequeened colony was removed. The rest of the frames in the hive was adjusted to have some space for a frame about the middle. The queen selected for introduction was taken out in its own frame with the attendant workers and gently kept in the space so created. Then the hive was covered with the roof and left to itself for about two days.

If the queen to be introduced had to be got from a distance it was got in a nucleus and kept close to the colony into which she was to be introduced, for two or three days, so as to allow the "nucleus" to calm down, and adjust itself to the new surroundings.

The introduction of queens was attempted from 1953 to 1956.

The usual method i.e. dipping the queen in honey and introducing in the hive was tried in 17 cases in all in the months of March, April, June, October and November at Coimbatore, Badiadika, Bailur, Aduthurai

and Sullia. Of these trials only 11 queens (or 65%) were accepted. The queens introduced in the way are not accepted if once the workers have started laying. But when the queens are to be got from distant places or by post, this is the only feasible method to be adopted.

In the "nucleus method" of queen introduction the percentage of success is as high as 91. Introductions effected immediately after de-queening the Parent colony, after periods of prolonged queenlessness and even after the workers had started laying were accepted. These trials were conducted at Coimbatore, Sullia and Aduthurai during the months of January, February, March, April, June, July, August and November. Thirty three trials were conducted in all and 91% of the queens so introduced were accepted.

As the continuity, progress and performance of a colony depends on the queen heading it, to avoid any chance of balling of the introduced queen it is better to introduce the queen in its own frame of brood and workers, i.e. "nucleus method" of queen introduction.

Entomology Section.
A. C. & R. I.,
Coimbatore.

M. S. SUBBIAH, B. A., B. Sc., (Ag.)
&
N. KRISHNASWAMY.

OBITUARY.

We regret to announce the demise of Sri M. Anandan, L. Ag., Retired Head-Quarters Deputy Director of Agriculture, Madras in September 1958 in Tanjore District.

After matriculating from the Municipal High School, Cannanore, Sri M. Anandan entered service as a clerk in the Agricultural Department. On account of his promising nature he was admitted to the Diploma course. After acquiring the Diploma in Agriculture, he joined the Paddy section as a research assistant. By dint of his ability and hard work, he rose successively to the posts of Superintendent, Paddy Specialist and Head-Quarters Deputy Director of Agriculture, Madras. He was largely responsible for organising the Agricultural Research Station, Pattambi. A large part of his official career, he spent in Tanjore District as Assistant Paddy Specialist, District Agricultural Officer, Deputy Director of Agriculture and after retirement, in the Orthanad Agricultural School. He was associated with the M. A. S. U., for a long period. He is survived by his wife, a daughter and grand children.

We offer our heartfelt condolences to the members of the bereaved family.

**Resolution passed at the General Body Meeting of the
Agricultural Upper Subordinates' Association
on 30th October 1958 at Coimbatore.**

RESOLUTION No. 1 :

The Association specially reiterates the following resolutions already submitted:—

(a) Confirmation of subordinates as early as possible after satisfactory completion of probation (Resolution No. 8 passed on 7th September 1957)

(b) Forwardal of applications from subordinates of this department to Central Govt. and commodity Committees without insisting on resignation from this department (Resolution No. 4 passed at the general body meeting on 20th July 1958 held at Trichy).

RESOLUTION No. 2 :

The Association requests the Government to kindly post one District Agricultural Officer for every Revenue Division for effective supervision and to enhance food production.

RESOLUTION No. 3 :

The Association after careful consideration requests that the posts of personal Assistants to the District Agricultural Officer may be revived in order that the D. A. O. may get the technical assistance at the headquarters (Resolution No. 4 passed on 7th September 1957). The Association also requests that posts of Junior Superintendent may be continued to help the District Agricultural Officer and the Personal Assistant in matters pertaining to Accounts and administration.

RESOLUTION No. 4 :

The Association requests the Director of Agriculture to kindly accord permission to the upper subordinates to undergo Post-Graduate training at Indian Agricultural Research Institute New Delhi in view of the limited number of seats available at the Post-graduate Institute Coimbatore. (Resolution No. 2. at the General Body Meeting at Trichy, 20th July 1958).

RESOLUTION No. 5 :

The Association requests the Government to kindly grant an additional pay of Rs. 20/- per month to those upper subordinates who possess or obtain a post-graduate degree or equivalent qualification.

RESOLUTION No. 6 :

The Association requests the Director of Agriculture to kindly permit upper subordinates to work for higher degrees by part time research inasmuch as the University is permitting such registration.

**Secretary,
Agricultural Upper Subordinates' Association**

Weather Review — for November, 1958.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January 1958
North	Madras (Meenambakkam)	18.5	+ 4.5	49.2
	Tirurkuppam*	13.1	+ 7.2	43.6
	Vellore	9.5	+ 1.8	41.0
	Gudiyatham*	5.0	— 0.8	34.7
East Coast	Palur*	7.4	— 0.4	29.6
	Tindivanam*	8.5	+ 3.3	35.3
	Cuddalore	7.6	— 7.9	38.1
	Nagapattinam	18.3	+ 0.8	31.1
	Aduthurai*	8.4	+ 0.7	28.3
	Pattukkottai*	8.1	+ 0.7	34.3
Central	Salem	2.7	— 1.1	33.8
	Coimbatore (A. M. O.)*	6.5	+ 1.6	22.0
	Coimbatore	5.1	+ 1.1	22.1
	Tiruchirapalli	4.2	— 2.8	23.4
South	Mathurai	4.2	— 1.5	21.6
	Pamban	6.8	— 4.9	21.9
	Koilpatti*	7.2	+ 1.0	23.8
	Palayamcottai	2.9	— 4.5	20.5
	Ambasamudram*	9.1	— 2.0	32.5
	Nagercoil*	9.0	+ 0.7	42.0
Hills	Kodaikanal	7.5	— 3.5	50.6
	Coonoor*	11.2	— 1.0	53.4
	Ootacamund*	9.0	+ 5.9	49.5
	Nanjanad*	7.2	+ 4.2	59.5

* Meteorological Stations of the Madras Agricultural Department.

Due to a well marked trough of low pressure over the Southeast Bay of Bengal, rainfall was fairly widespread in South Madras State on the 1st and 2nd of November, 1958. Another trough of low pressure continued to persist in the East Arabian Sea off the Malabar and Kanara coasts till 7th November when it became less marked. On 3—11—1958, rain or thundershowers occurred at a few places in Madras State and the well marked trough of low pressure persisted over the South-west and adjoining West Central Bay of Bengal. Tamilnad received rain or thundershowers at a few places on 4th November 1958 and the weather was mainly dry on the next day. On 6—11—58 the depression in the Bay of Bengal became deep and South Madras experienced localised rain or thundershowers. The deep depression in the Central Bay of Bengal intensified into a cyclonic storm of small extent on 7—11—'58 and caused scattered showers in Madras State. On the next day the cyclonic storm weakened into a depression while rain or thundershowers occurred at a few places in Madras State. The feeble trough in the Eastern Arabian Sea still persisted. The Bay depression became further weakened into a trough of low pressure and lay on the morning of 10—11—'58 over the East Central adjoining north Bay of Bengal. Rain or thundershowers occurred at a few places in Madras State on 9—11—'58 and in South Madras on 10—11—'58. On the 11th and 12th of November the weather was mainly dry in Madras State and the trough of low pressure over the Bay became feeble and ineffective. Rain or

thundershowers occurred at a few places in South Madras State on 13-11-'58. Rain or thundershowers were fairly widespread in Madras State on the 14th of November, while on the next day, mainly dry weather prevailed. On 16-11-'58 rain or showers occurred at a few places but on 17th it was scattered in Madras State and occurred locally in coastal Madras State on 18-11-'58. A deep depression formed in the southeast Bay of Bengal on 19-11-'58 and caused fairly widespread rainfall in the coastal Madras State. It intensified into a cyclonic storm on 20-11-'58 and was centred about 250 miles eastsoutheast of Cuddalore. In association with the cyclonic storm widespread and locally very heavy rainfall occurred in the coastal Madras State. Rainfall has been fairly widespread in the interior Madras State on the same day. The cyclonic storm moved close to the coast of Madras State on 21-11-'58 and caused fairly widespread rain in the State. On that day heavy to very heavy rainfall was reported from a few places in Madras State. The Bay storm crossed north Madras on 21-11-'58 and on the morning of 22nd lay as a low pressure area over south Mysore and Rayalaseema. Rain or showers occurred locally in Madras State on 22nd November 1958. On 23-11-'58 showers occurred at a number of places in north Madras State. A shallow depression formed on 24-11-'58 in the East Arabian Sea and showers occurred at a few places in Madras State for six days from 24th November '58. On 30-11-'58 the weather was mainly dry throughout the State.

Night temperatures were above normal in Madras State for six days in November 1958.

Rainfall: The noteworthy rainfalls and the zonal rainfalls for November 1958 are furnished hereunder:

Noteworthy rainfalls			
No.	Date	Name of place	Rainfall in inches
1.	3-11-1958	Koilpatti	4.27
2.	9-11-1958	Coonoor	4.10
3.	20-11-1958	Tirur	6.01
4.	20-11-1958	Aduturai	4.40
5.	20-11-1958	Cuddalore	3.90
6.	20-11-1958	Nagapattinam	7.80
7.	21-11-1958	Tindivanam	3.86
8.	21-11-1958	Pattukottai	3.37
9.	21-11-1958	Nanjanad	3.70
10.	21-11-1958	Ootacamund	6.45
11.	21-11-1958	Madras (Meenambakam)	6.10

Zonal rainfall (in inches)			
Name of Zone	Rainfall for November, 1958	Departure from normal	Remarks.
North	11.5"	+ 3.2"	Above normal
East Coast	9.7"	- 0.5"	Below normal
Central	4.6"	- 0.3"	"
South	6.5"	- 1.9"	"
Hills	8.7"	- 1.4"	"

Agricultural Meteorology Section,
Lawley Road Post, Coimbatore-3.
15th November, 1958.

C. B. M., M. V. J. & A. K. V.

Departmental Notifications

Gazetted Officers—Madras Agricultural Department. Postings and Transfers during the month of December 1958.

Name and Designation	Transferred or Posted to
Sri K. Sriraman, Seed Dev. Officer, Madras	L. A. P. for 11 days from 16-11-58.
„ R. M. Chidambaram, Dy. Director, (drilling) Madras	Earned leave for 30 days from 4-10-'58 to 3-11-'58.
„ C. S. Sridaran, Gl. Superintendent, Industrial Engineering Workshops, Madras	Posted as Dy. Director (Drilling) Madras.
„ M. Damodara Prabhu, Addl. Lecturer in Agriculture, Coimbatore	L. A. P. for 1 month from 1-12-'58 to 31-12-'58.
„ K. Kuppmuthu, Addl. Lecturer II, Coimbatore	To be in Addl. Charge of the above post.
„ R. Subbiah Pillai, Horticultural Dev. Assistant	To act as Dt. Agrl. Officer, Madurai, Vice Sri. R. Krishnamurthy applied for leave.
„ T. D. Muthuswami, Asst. Agronomist, Pandiarajapuram	Posted as Cane Dev. Officer, (Training) Central Sugarcane Research Station, Cuddalore.
„ S. Gonsalves, Asst. Agrl. Engineer	Posted as Head quarters Asst. Agrl. Engineer, Office of the Director of Agriculture, Madras on the completion of the refresher course.
„ K. Lingannan, Hd. Qrs. Asst. Agrl. Engineer, Office of the Director of Agriculture, Madras	Posted as Asst. Director, Govt. Industrial Engineering Workshops, Madras.
„ S. N. Swaminathan, Asst. Director, Govt. Industrial Engineering Workshops, Madras	Transferred as Asst. Director, Cuddalore.
Dr. K. S. Venkataramani, M. Sc., Ph. D., C. o. U. P. A. S. I.	Appointed as Reader in Horticulture, Regional Post Graduate Research Institute, Coimbatore.
Sri V. G. Venkataramana Rao, Asst. Marketing Officer Cuddalore	Earned leave for 10 days from 17-11-'58 to 26-11-58.
„ M. K. Lingiah, Dt. Agrl. Officer, Cuddalore	To be in current Addl. charge of the above post.
„ M. K. Venkatasubramaniam, Supdt., A. R. S., Tirurkuppam	L. A. P. for 4 months from date of relief.
„ V. Krishnaswami, Asst. Paddy Specialist, Tanjore	Posted as Supdt. A. R. S., Tirurkuppam.
„ M. Kandaswami, Lecturer in Mycology	Extension of earned leave for 30 days from 17-11-'58.
„ T. Arunachalam, Upper subordinate	Posted as Dt. Agrl. Officer, Erode.
„ C. A. Parangussdoss, Assistant Director of Industries and Commerce, allotted to the Agrl. Department	Assistant Director, (Borewell Scheme) Tirunelveli.
„ P. R. Nagaraja Rao, Asst. Entomologist, (Paddy stem borer scheme) Aduthurai	L. A. P. for 14 days from 6-12-'58.

Name and Designation	Transferred or Posted to
Sri M. Edwin Amirtharaj, Dt. Agrl. Officer, Tirunelveli (North)	Earned leave for 13 days from 22nd December 1958 to 3-1-59.
„ S. V. Kuppuswami, Asst. Agrl. Chemist, Coimbatore	Extension of Leave on average pay for 29 days from 19-12-'58.
„ D. John Durairaj, Reader in soil science, A. C. & R. I., Coimbatore	Deputed to U. S. A., under the Technical Co-operation mission Programme for advanced training.
„ J. Sankaram Rao, Addl. Lecturer in Botany, Coimbatore	„ „

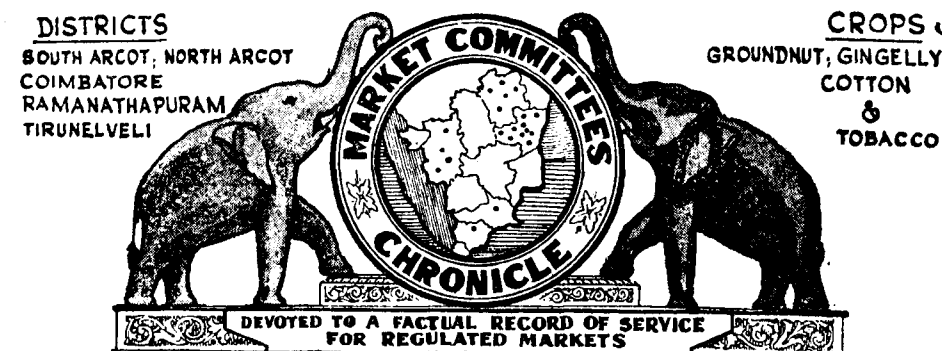
Upper Subordinates -- Agricultural Department
Postings and Transfers during the month of December 1958.

Name and Designation	Transferred or Posted to
Sri T. M. Govindaswamy, Compost Inspector, Kallakurichi	Promoted as Upper Subordinate and posted to Trichy.
„ P. Ramadoss, Compost Inspector, Shirkali	Promoted as Upper Subordinate and posted to Trichy.
„ K. G. Shanmugavelu, B. Sc., (Ag.),	Appointed as Fruit Asst. Fruit Research Station, Periakulam.
„ G. Shanmugasundaram, B. Sc., (Ag.),	Appointed as Upper Subordinate and allotted to Tanjore region.
„ A. Damodaran, Spl. Agricultural Demonstrator (Cotton) Kadambur (North)	Transferred as Assistant in cotton (Karunganni) Koilpatti.
„ M. Saravanabhavanandam	Posted as Asst. in paddy, Agrl. College and Research Institute, Coimbatore.
„ M. D. Padmanabhan	Appointed as Assistant in Entomology (Paddy stem borer scheme), Aduthurai.
„ G. M. Janardanam, Chemistry Asst., Dharapuram	Assistant in Chemistry, (Ghee grading) Coimbatore.
„ V. Subramaniam, Assistant in Chemistry, (Ghee grading) Coimbatore	Assistant in Chemistry, (Ghee grading) Dharapuram.
„ V. Subramaniam, Soil conservation Asst., Tiruvellore	Farm Manager, Pulliamgudi, Tirunelveli District.
„ V. N. Raja Rao	Asst. in paddy, Agrl. College & Research Institute, Coimbatore.
„ M. Dinakaran, Asst. Lecturer in Botany, Agrl. College, Coimbatore	Asst. in Chemistry, A. C. & R. I., (Saline and alkaline scheme).
„ M. Guruswamy, A. Spl. Agrl. Demonstrator, (K. 5 cotton Scheme) Sulur, Coimbatore	Supervisor, Coimbatore (Scheme for trials on cultivators field).
„ G. Ramanathan, Asst. in Mycology, A. C. & R. I.	„ „ „
„ K. P. Srinivasan, Spl. A. D., (Sugarcane) Gudiyatham	„ „ „
„ T. L. Subramaniam, Addl. Dairy Manager, A. C. & R. I.	„ „ „

Name and Designation	Transferred or Posted to
Sri K. M. Ramanathan, Plant Protection Asst., Salem	Upper Subordinate in the scheme on storage of groundnut A. C. & R. I., Coimbatore.
„ A. Jagadesan, Asst. in Chemistry, Coimbatore	Entomology cum Mycology Assistant, A. C. & R. I.
„ V. Rangarajan, Entomology cum Mycology Asst., A. C. & R. I., Coimbatore	Assistant in Entomology, A. C. & R. I., Coimbatore.
„ N. Ramachandran, Plant Protection Asst., Coimbatore	Extension Officer, for Agri., Perundurai Block.
„ V. Venugopal, Extension Officer for Agriculture, Coimbatore	Plant Protection Asst., Coimbatore.
„ S. Nagappan, Oil-seed Dev. Asst., Madras	Asst. in Entomology, Coimbatore.
„ R. Venkataraman, Asst. in Paddy, Palur	Asst. to the Agricultural Meteorologist, Agricultural College, Coimbatore.
„ K. Kallel Ahmed, Asst. to the Agri. Meteorologist, Coimbatore	Chemistry Asst., Agricultural College, Coimbatore.
„ R. Jayarajan, Agri. Demonstrator, Tirupallani	Asst. in Mycology, Betel vine scheme, Pothanur.
„ K. K. Subbiah, Instructor in Agri., Pattukotai	Horticultural Dev. Asst. Pattukotai.
„ J. Ebonesar, „ „	Farm Manager, State seed farm, Seemavaram, Chinglepet District.
„ S. Sankaranarayanan, Farm Manager, State seed farm, Seemavaram	Alloted to Madras Region.
„ K. Krishnan, Paddy Asst., Palur	Farm Manager, State seed farm, Veeram, S. Arcot Dt.
„ Charles Danial, Cane Asst., Cuddalore	Paddy Asst., Palur.
„ S. Sambandamurthi, Horticultural Dev. Asst., Trichy	Fruit Asst., Aduthrai.
„ A. K. Kadirvelu, Agricultural Demonstrator, Ponnamaravathi	Cane Asst., Cuddalore.
„ P. Annamalai, Farm Manager, Papparapatti, Salem District	Paddy Asst., Coimbatore.
„ D. D. Chinnappa, Cane Asst., Cuddalore	Agri. Demonstrator, Cuddalore.
„ D. Rajamanickam, Agri. Demonstrator, Arantangi, Tanjore	Cane Asst., Cuddalore.
„ A. Rajamany, Spl. Agri. Demonstrator, (Cotton) Srivilliputhur	Certification Inspector, Srivilliputhur.
„ P. Manickavasagam, Fodder Research Asst., Coimbatore	Potato Assistant, Nanjanad.
„ A. Bellio, (Fieldman, promoted) Potato Asst., Nanjanad	Allotted to Coimbatore District.
„ S. R. Jasokharan, Agri. Demonstrator, Uthamapalayam	Chemistry Assistant, Coimbatore (under Field Manure Officer, Coimbatore).
„ T. K. Gopal Rao, Spl. A. D., (sugarcane) Karur	Cane Assistant, Vadapathimangalam, Tanjore District.

Name and Designation	Transferred or Posted to
Sri C. M. Ratnasingh, Cano Asst., Vadapathimangalam	Paddy Asst., Aduthurai.
„ T. Venkataraman, Oilseeds Dev. Asst., Orathanad	Entomology Assistant, Kulithalai.
„ S. Ramamurthi Oilseeds Asst., Pollachi	Oilseeds Dev. Asst., Orathanad.
„ Y. Abdul Shakoor, Fruit Asst., Coonoor	Farm Manager, State Seed Farm, Pappalapatti, Salem Dt.
„ G. Obliswamy, Agrl. Demonstrator, Sankaridrug, Salem Dt.	Chemistry Asst., Coimbatore.
„ T. K. Ramachandran, Agrl. Demon- strator, Veeralimalai, Trichy Dt.	Coconut Nursery Asst., Pattukottai.
„ R. Rangaswamy, (Fieldman Promoted) Coconut Nursery Asst., Pattukottai	Allotted to Tanjore Region.
„ K. Gopalakrishnan, Paddy Asst., Tirur	„ to the Madras Region.
„ K. Seshadri, Botany Assistant, Coimbatore	Mycology Asst., Coimbatore.
„ P. Subramaniam	Chemistry Asst., Gudiyatham.
„ S. Kaliaperumal	Fruit Assistant, Coonoor.
„ V. Kaliyannan	Chemistry Asst., (ghee grading) Dhara- puram.
„ R. Kumaraswamy	Paddy Assistant, Coimbatore.
„ G. Varadharajan	Entomology Assistant, Agricultural College & Research Institute, Coimbatore.
„ R. Natarajan	Chemistry Assistant, Coimbatore.
„ N. S. Venkataraman	„ „ „
„ A. V. Thangamani	Chemistry Assistant, (Ghee Grading) Coimbatore District.
„ S. Venkataraman	Chemistry Assistant, (Ghee Grading) Karur, Trichy District.
„ T. S. Govinden	Chemistry Assistant, Sugarcane Research Station, Cuddalore.
Kumari N. R. Rukmani	Chemistry Assistant, Coimbatore.
Sri T. V. Sasikumar	Allotted to Madura Region.

Madras Agric. J., 45: (12) 483-489, 1958



Review of market conditions of commercial crops in the notified areas for the month of November, 1958.

Cotton: In this section lint: Candy of 784 lbs.

Kapas: Pothi of 280 lbs.

Tirupur: Coimbatore District: Season: There was a rainfall of 12.55 centimeters received at Tirupur and these rains were received in most parts of the district during the month. These showers have helped to an extent in arresting damage by pests on the cotton crop. On the whole the seasonal conditions during the month were generally good and helpful to the cotton growers.

Arrivals and transactions: Lint: During the month the market started with an opening balance of 7128 candies of Cambodia and 2503 candies of Karunganni lint. The total arrivals into the Market were 3408 candies of Cambodia and 182 candies of Karunganni which included 1081 candies of Cambodia and 7 candies of Karunganni locally ginned, despatches from Tirupur accounted for 5799 candies of Cambodia and 1644 candies of Karunganni lint which were sent to Madras, Salem, Madurai, Dindigul and places in Bombay, Kerala, Andhra and New Delhi. At the end of the month there was a closing stock of 4737 candies of Cambodia and 1041 candies of Karunganni lint.

Kapas: The kapas market started with an opening balance of 9511 pothis of Cambodia and 1164 pothis of Karunganni kapas. The total arrivals into the Tiruppur Market were 16369 pothis of Cambodia and 81 pothis of Karunganni kapas. The disposals during the period were 17448 pothis of Cambodia and 1050 pothis of Karunganni kapas, in the market area of Tirupur. At the end of the month market closed with a balance of 8432 pothis of Cambodia and 195 pothis of Karungann kapas.

Prices: There was only normal demand for all types of kapas. The price ranges were as follows:

Prices in Rs. Lint in candy of 784 lbs.

	<i>During November, 1958.</i>	<i>During October, 1958.</i>
Cambodia superior quality	Rs. 900—981	Rs. 900—981
„ average „	Rs. 815—875	Rs. 810—870
Karunganni superior „	Rs. 870	Rs. 850

Kapas per pothi of 284 lbs.

	<i>During November, 1958.</i>	<i>During October, 1958.</i>
Cambodia superior quality	Rs. 127—140	Rs. 145—150
„ average „	Rs. 115—125	Rs. 120—130
Karunganni superior „	Rs. 115.00	Rs. 127.00

Ramanathapuram district: Season: The rains received during the month were much below normal.

Arrivals and transactions: The following were opening stocks, arrivals, disposals and closing stocks of kapas and lint in important markets in the district during the month.

Kapas in pothis of 280 lbs:

Name of Market	Opening stock	Arrivals	Disposals	Closing balance
Virudhunagar	... 200	700	900	Nil.
Sattur		...	...	...
Rajapalayam	... 500	1750	2250	...
Total	... 700	2450	3150	Nil.

Lint in candies of 784 lbs:

Virudhunagar	... 200	90	90	200
Sattur		...	...	...
Rajapalayam	... 830	225	625	430
Total	... 1030	315	715	630

Prices: The following were the prices of cotton kapas, lint and seeds in the district during the month as compared to that of the previous month.

Kapas in pothi of 280 lbs.

	<i>November '58.</i>	<i>October '58.</i>
Karunganni	... Rs. 93—98	Rs. 88—96
Karunganni Kodai	... Rs. 75—81	...
Inferior Uganda	... Rs. 60—100	...

Lint in candy of 784 lbs.

Karunganni	... Rs. 691—728	Rs. 706—790
Tinny Karunganni	... Rs. 658.	Rs. 658—701
Tinny	... Rs. 550—656	Rs. 570—650
Certified Uganda	... Rs. 1046—1571	...
Uncertified Uganda	... Rs. 1046—1141	...

Seeds in Maund of 82 2/7 lb:

Karunganni	... Rs. 11.00—12.50	Rs. 10.33—12.00
Tinny	... Rs. 12.66	Rs. 12.33—12.75
Uganda	... Rs. 10.66—11.00	...
Inferior Uganda	... Rs. 8.66—9.33	...

Groundnut: (In this section kernels are in candy of 531 lbs and pods in tons).

South Arcot district: Groundnut kernels: Arrivals of winter crop increased during the month. The district produce amounted to 3767 tons while receipt from other districts like Coimbatore, Salem, North Arcot, and Tiruchi came to 1022 tons and Imports from other States totalled 67 tons. Consumption by mills and *chekkus* amounted to 2452 tons and 315 tons respectively. Despatches to other districts like Madras, Tiruchi, Tanjore and Salem came to 901 tons and export to Pondy State to 30 tons. Wastages calculated 372 tons. The stock with the trade at the end of the month stood at 1993 tons.

Prices declined during the month and the averages at the several markets varied from Rs. 140/- —166.10 per candy of 531 lbs. according to quality.

North Arcot District: Season: Rains during the month continued to be widespread and heavy throughout the district.

Arrivals and transactions: During the month the arrivals were moderate. The following were the stocks, arrivals, disposals and prices.

	Opening stock	Arrivals	Disposals	Closing stock
Groundnut pods (in tons)	... 937	6910	7365	482
Groundnut kernels				
(in edy.)	... 600	12735	13570	...

Prices: The prices of groundnut and its products were on the decline during the month compared to that of last month.

	November, 1958.		October, 1958.	
Groundnut kernels (Cdy. of 531 lb.)	Rs.	140—167	Rs.	180—203
Groundnut pods (Bag. of 80 lb.)	Rs.	9—18.50	Rs.	10—19
Groundnut oil (Cdy. of 500 lbs.)	Rs.	317—345	Rs.	345—358
Groundnut cake (Md. of 82 2/7 lb.)	Rs.	9—20	Rs.	11—12
	Opening stock	Receipt	Disposals	Closing stock
Pods (in tons.)	...	400	300	100
Kernels (in cdy. of 531 lb.)	50	1850	1300	600

Prices: The following were the price range that prevailed for groundnut pods, kernels, and oil during November, 1958 compared to that of October, 1958.

	November, 1958.		October, 1958.	
Groundnut pods (bag. of 80 lbs.)	Rs.	16—18	...	
„ kernels (cdy. of 531 lbs.)	Rs.	170—190	Rs.	170—200
„ oil (cdy. of 500 lbs.)	Rs.	325—355	Rs.	335—350
„ oil cake (Mds. of 82 2/7 lbs.)	Rs.	11.33—13.00	Rs.	11.00—12.50

Gingelly: (In this section bag is 168 lbs.).

Ramanathapuram District: Arrivals and transactions: The following were the arrivals and disposals of pods and kernels during November, 1958.

South Arcot District: Arrivals amounted to 2503 bags. All the quantity excepting 54 bags were received at Vridhachalam. Apart from this, another 640 bags were received in the market from Tiruchi district. Despatches to Madras, Salem and Tanjore districts came to 1321 bags. Consumption by mills and *chekkus* amounted to 15 and 1803 bags respectively. The stock with the trade at the end of the month stood at 1464 bags.

Prices declined by Rs. 4/- per bag. Average price per bag came to Rs. 60.71 at Vridhachalam Market.

Tobacco: (In this section tobacco is in candies of 500 lbs.).

Coimbatore District: Arrivals and transactions: Plantings of tobacco reported to be completed in most of the areas of the district. The conditions of the standing crops were reported to be satisfactory.

At the end of the month under report there was a stock of 12,755 candies of chewing and 530 candies of cheroot tobacco. About 3755 candies of chewing and 200 candies of cheroot tobacco were exported to South Arcot, Madurai, Salem, Tirunelveli, Tiruchi, Ramanathapuram and Nilgiris districts of Madras State and places in Mysore, Bombay, Kerala and Andhra States.

The tobacco Market continued to be steady with good demand from traders of Kerala State.

Prices: The price ranges were as follows:

Variety	Prices in Rs. per candy of 500 lbs.		
	I Grade	II Grade	III Grade
1. Chewing tobacco (Sun-cured):			
(a) Meenampalayam	400—485	200—330	120—185
(b) Other varieties	325—400	225—300	150—225
2. Cheroot varieties:			
Sun-cured grown in			
Erode and Bhavani taluks	260—440	210—250	140—200
3. Chewing tobacco:			
Pit cured grown in Palladam and Sular areas.			
	250—325	160—200	90—130

Cardamom: Madurai District: There were heavy rainfall in the Cardamom plantation areas in Madurai district during November, 1958. The condition of the standing crops were reported to be good.

Arrivals of Cardamom were reported to be good in all the important assembling market centres in Madurai district. Despatches from Bodinaickanoor, to North Indian States were good besides large quantities were exported to London, Scandinavian Countries etc.

The estimated arrivals and stock positions of Cardamom during November, 1958 were as hereunder:

Name of Centres.	Quantity in lb.		
	Estimated Arrivals.	Estimated Despatches.	Estimated closing stock.
1. Bodinaickanur	... 2,27,000	2,23,000	27,000
2. Thevaram	... 45,000	28,000	22,000
3. Pannaipuram	... 40,000	35,000	15,000
4. Kombai	... 28,000	10,000	25,000
5. Uthamapalayam	... 20,000	17,000	8,000
6. Cumbum	... 80,000	30,000	1,00,000
7. Gudaloor	... 25,000	15,000	20,000
8. Pattiveeranpatti	... 71,000	69,000	15,000
9. Virudhunagar	... 50,000	48,000	14,000
	5,86,000	4,75,000	2,46,000

Prices: The minimum and maximum prices of Cardamom that prevailed during November, 1958 for different qualities were as detailed below:

Name of Market	Trade Variety	Prices per lb.
(a) <i>Bodinaickanoor:</i> (1)	<i>Green Bulk.</i>	
	(Superior extra green)	Rs. 9.49 to 9.50
	Medium	" 8.00 to 8.45
	Inferior Shipment	etc. "
	(2) Splits	" 7.50 to 7.96
	(3) Lights	" 7.00 to ...
	(4) Seeds	" 5.50 to 7.26
	(5) General (Average price per lb.)	" 11.60 to 12.00
		" 8.29 ...
(b) <i>Thevaram:</i> (1)	<i>Green bulk.</i>	
	Superior	Rs. 9.13 to 9.56
	Bold	" 9.75 ...
	Medium	" 8.48 to 9.00
	Inferior	" 8.31 to 8.36
	(2) Shipment	" 7.92 to 8.29
	(3) Seeds	" 10.70 ...
	(4) General average	" 8.84 ...
(c) <i>Virudhunagar:</i> (1)	<i>Green bulk</i>	
	(2) Superior	" 9.00 to 9.25
	(3) Medium	" 8.50 to 8.75
	(4) Inferior	" 8.25 ...
	(5) Seeds	" 11.75 ...
	(6) Bold qualities	" 9.75 ...

Review of administrative activities of market committees during November, 1958.

General: The Market Committees of South Arcot Market Committee, North Arcot Market Committee, Coimbatore Market Committee and Tiruchirapalli Market Committee continued to function during the month. Efforts are being made to function the Market Committees of Ramanathapuram and Tirunelveli due to the disposals of the case in the Supreme Court.

Enforcement: The progress of licensing by the Market Committees during the month were as follows:

Name of the Market Committees	Section 5 (I)		Section 5 (3)		Weighmen	
	A	B	A	B	A	B
South Arcot Market Committee	316	2475	260	1817	236	1679
North Arcot Market Committee	741	2351	727	2091	125	783
Coimbatore Market Committee	146	1487	87	1153	1	605

A = Licences issued during the month.

B = Licences issued up to the end of the month.

Meetings: The eighth ordinary meeting of North Arcot Market Committee was held at Tiruvannamalai on 25—11—1958. At this meeting the Committee discussed the Budget proposals for 1959 and Revised estimates for 1958 and approved the same being forwarded to Government.

There were no meetings held in other Market Committees during the month under report.

Quality Analysis: Nil.

Quality Competition: Nil.

Crop and Trade Reports

Redgram crop—First forecast report—1958—'59: The area sown with redgram up to 25th August 1958 in the Madras State is estimated at 116,700 acres. Compared with the area of 116,000 acres estimated for the corresponding period of the previous year, the current year's estimate shows an increase of 0.6 per cent. This is an increase of 2.0 per cent when compared with the average area of 114,400 acres calculated for the five years ended 1957—'58.

The crop is mainly grown in the districts of South Arcot, Salem, Coimbatore and Tiruchirappalli. The area under the crop is nil or negligible in the Nilgiris district. A decrease in area as compared with previous year is estimated in the districts of South Arcot, Tiruchirappalli and Madurai and an increase in area in all the other districts of the State except Chingleput, Ramanathapuram and Kanyakumari districts where the area under the crop estimated is the same as that for the previous year.

It is too early in the season to forecast the trend of the yield in the different districts of the State.

The average wholesale price of tur dhal per standard maund of 82.27 lb. or 3.200 tolas as reported from certain important market centres on 5th September 1958 was Rs. 17.05 at Salem, Rs. 24.56 at Tiruchirappalli, Rs. 25.20 at Vellore and Rs. 28.98 at Cuddalore. Compared with the prices which prevailed during the corresponding period of the previous year the current year's prices reveal a fall of 1.2 per cent at Salem and a rise of 7.3 per cent at Tiruchirappalli and 15.5 per cent at Vellore and 18.4 per cent at Cuddalore.

Gingelly—First Report—1958—'59: The area under gingelly up to the 25th July 1958 is estimated at 1,46,100 acres. Compared with the area of 1,41,000 acres estimated for the corresponding period of the previous year, the present estimate shows an increase of 3.6 per cent. When compared with the average area of 1,42,000 acres calculated for the five years ended 1957—'58, it shows an increase of 2.9 per cent.

An increase in area is estimated in all the districts of the State except Tanjore, Ramanathapuram, Tirunelveli, the Nilgiris and Kanyakumari. The area under the crop in Tanjore, Ramanathapuram and Kanyakumari districts is estimated to be the same as that for the previous year while a decrease in area is estimated in Tirunelveli district. The area under the crop is nil or negligible in the Nilgiris district.

It is too early in the season to forecast the trend in the yield of the crop.

The wholesale price of gingelly seed per standard maund of 82.27 lb. (3,200 tolas) as reported from important market centres on 1st August 1958 was Rs. 37.54 at Coimbatore, Rs. 32.50 at Cuddalore, Rs. 29.60 at Salem and Rs. 25.26 at Tiruchirappalli. Compared with the prices which prevailed during the corresponding period of the previous year, the current prices show a decrease of 31.1 per cent at Tiruchirappalli, 20.8 per cent at Cuddalore, 16.9 per cent at Salem and 11.0 per cent at Coimbatore.

COLLEGE AND ESTATE NEWS

Students Activities—Athletics: Our athletes represented our College in the University Inter-Collegiate Athletic Meet held at Vellore on 14th & 15th of November 1958. It was up to our athletes to defend the Scudder shield of which we were holders last year. Under the able captaincy of Joe Mathias the team was kept fit till the meet. Unfortunately and unexpectedly, in the end we were wanting $\frac{1}{2}$ point more to win the team Championship. Nevertheless, many first and second places were knocked off by our athletes, — Joe Mathias won the Shot put and second place in Discus throw, and Ramasamy as expected retained his first place in Javelin throw. Our College Champion, Gopalakrishna Shenava breasted the tape first in a good timing in the 400 meter race. Our High Jumper and Volter was adjudged as the 2nd in the High Jump event even though he cleared the same height as the 1st. Varkey did well and got places in 400 meters hurdles and 800 meter race. The 4 x 400 meter race was yet another interesting event which was won by our team, comprising of Varkey, Medappa, Ramaswamy, and Shenava.

From our College Joe Mathias, Ramaswamy and Shenava were selected to represent the Coimbatore Division in the Inter-Division Sports held in Tuticorin on 22nd & 23rd in November. Again Joe Mathias won both the Shot-put & Discus. Ramaswamy was 2nd in the Javelin event, and Shenava was only third in his 400 meters race. Our College was the most to contribute to the Coimbatore Division. Joe Mathias was selected to attend the University coaching Camp at Madras which he is attending now.

In the Coimbatore Olympics, Joe, again got first in the shot-put event and Ramaswamy won the Pentathlon event and thus brought credit to our College.

In the 400 meters open race in connection with the Govt. Arts College Sports G. Shanava won the 1st place; Medappa won the 2nd place in the open mile race in the Forest College sports.

Games: Our College Basket ball and Volly Ball teams won the respective rolling cups in the tournaments conducted by the Palghat College. Rajanikumar, our Cricket player was selected to represent the mofussil Colleges against the City Colleges. The Badminton team has come to the finals in the University Inter-Collegiate.

Literary and Arts: Debates: Our College swept all the four prizes in the inter-Collegiate debating competition conducted by the Planning Forum of the P. S. G. College of Technology. Messrs. Alamgeer and K. S. Sundareshan represented the Tamil team and Mr. Krishna Balal and

Kumari Vijayalakshmi represented the English. Our lady representative won places both in the first and second rounds in the University Inter-Collegiate debate and came up to the finals.

Drama: Here again our College dramatic teams in English and Tamil have made a record by winning the Rolling cups and individual cups assigned for these Competitions. Sri. K. S. Sundaresan ably supported by others acted the Shakspearean drama Merchant of Venice in Tamil, the script written by Mr. Alamgeer,

Officers' Club: (Golden Jubilee Celebrations) The Golden Jubilee of the Agricultural College Officers' Club (1908-'58) was celebrated with great pomp and eclat on Sunday the 23rd November 1958. Dr. Sri C. P. Ramaswamy Iyer inspected a guard of honour, hoisted the National Flag and delivered the Jubilee address touching on various aspects of the College and Club. He paid a glowing tribute to the achievements of the members of the Club and their services to the department and also recalled his old association with the A. C. & R. I. Due to the unavoidable engagements elsewhere of the Hon'ble Minister Sri M. Bakthavatsalam, Dr. K. C. Naik presided over the function. Dr. A. Mariakulandai, President of the Club welcomed the chief guest and Mr. T. D. A. Jayaseelan, Club Secretary read the report tracing the history, role and utility of the Officers' Club. Sri C. P. Ramaswamy Iyer generously offered a donation of Rs. 250/- for improving the activities of the Club. He distributed prizes to the winners in various items of Club Day Games and Sports.

The Hon'ble Minister for Agriculture along with Dr. C. P. Ramaswamy Iyer graced the luncheon that was held on the occasion.

The members put up a wholesome entertainment in the evening. A beautiful Souvenir containing interesting articles was got up for the occasion.

Award of Research Degrees: Sri Daniel Sundararaj, Lecturer in Botany, has been awarded the Ph. D. degree of the Madras University for his thesis "Studies in the Physiological anatomy of grasses—atomy as an index for drought resistance."

Srimathi A. Leela David, Assistant Entomologist has been awarded

M. Sc. degree by the University of Madras for her thesis "South Indian *Phaneropteridae*."

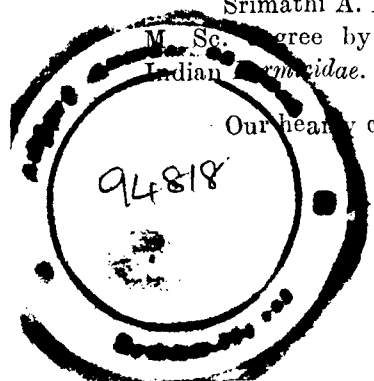
Our hearty congratulations to them.

Editor, M. A. J.

The Madras Agricultural Students' Union.

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46. " K. M. Venkatachalam, Dip. Econ., 16, Chockalingam Pillai Street,



Announcement.

The following prizes and awards are given by the M. A. S. U. every year during the College Day and Conference.

1. Ramasastrulu Munagala Prize.
2. V. C. Vellingiri Gold Medal for the best research work of the department.
3. Golden Jubilee rolling shields.
 - (a) N. Veeraraghavalu Naidu shield for Agricultural botany.
 - (b) T. Konda Reddy shield for Agronomy.
 - (c) O. M. Lakshminarayana Reddy shield for horticulture.
4. Hon'ble M. Bhaktavatsalam medal for the best outgoing student in horticulture.
5. Hon'ble C. Subramaniam medal for the best outgoing Student in Plant Pathology.
6. G. Rangaswamy Naidu prize for the best research worker in Sugarcane.
7. Ramakrishna medal for the best research worker in Cotton.
8. Krishnaswami Naidu prize for the best student in Agricultural practical and *viva voce*.
9. S. Sambamurthy medal for the best outgoing student in Agricultural economics (To be instituted in the coming year).

Note :— For items 1 to 5 refer, M. A. S. U. issues April, June, July 1958 for rules for the award.
Items 6, 8, the rules for the award are yet to be prepared.

V. Subbiah,
Secretary.

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