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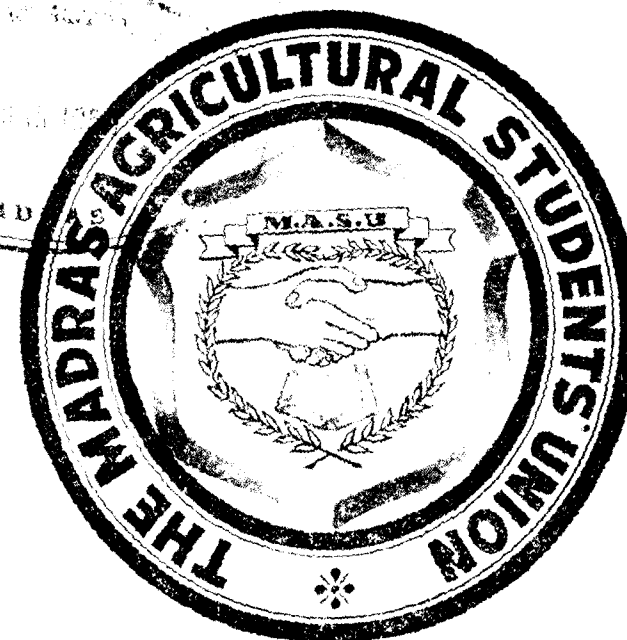
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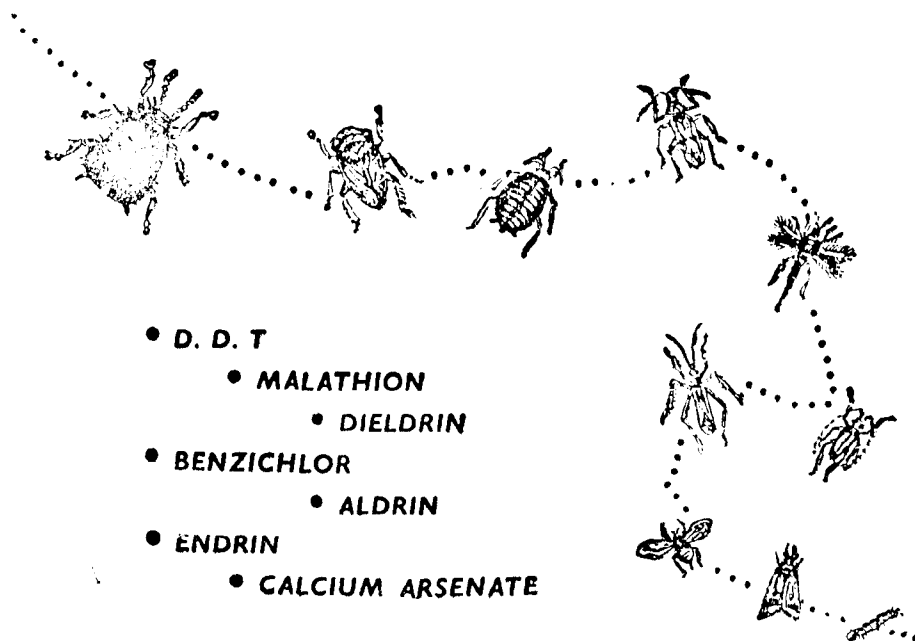
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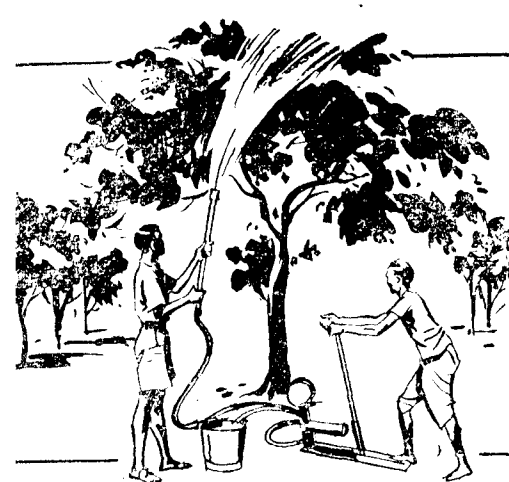


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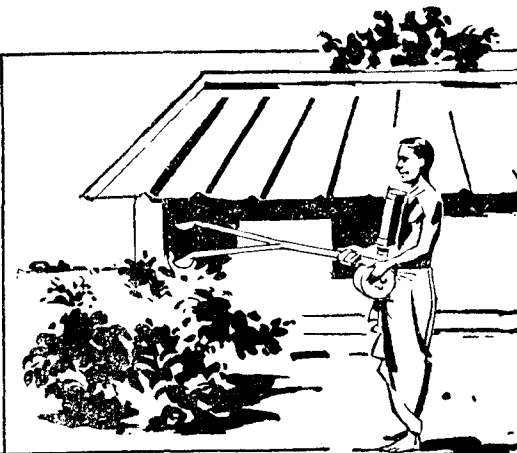
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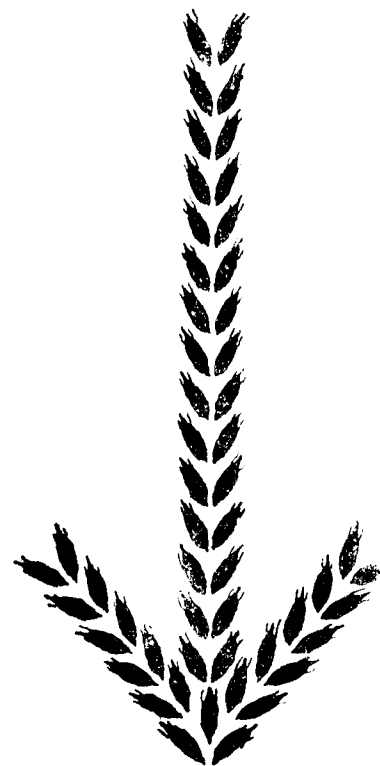
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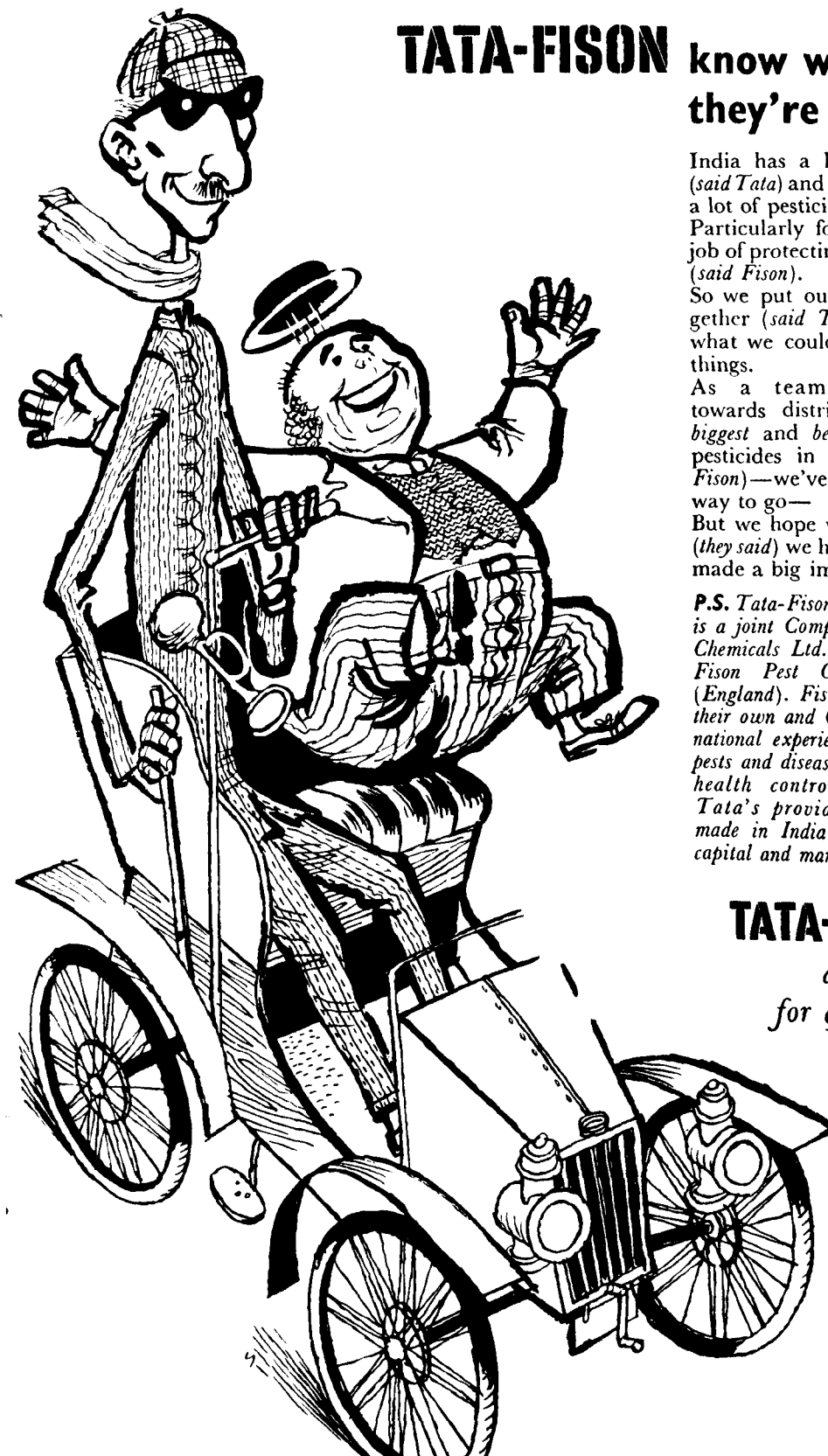
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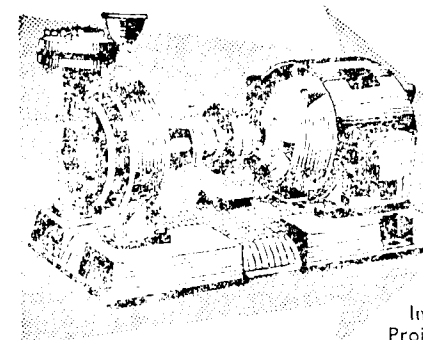
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The Madras Agricultural Journal

Vol. XLVI

February, 1959

No. 2

Editorial

Food and Prices: The President of India in his address to the new Budget session of Lok Sabha on 9th January 1959, has stated that "Food and Prices" are the most important features in the regulation of the country's economy, on which depend planning and progress. Self sufficiency in food alone, he added, can provide a satisfactory solution to many of the difficulties existing now and which will have to be faced in future. He had also outlined the measures that would increase production and these are already being practised all over the country in a greater or lesser measure but require greater emphasis. Improved crop strains are easy of adoption but great care is necessary to prevent the inevitable dilution of purity in the several stages of multiplication. Manures and fertilizers are well known to increase production. Cultivators are also fertilizer conscious but fertilizers are in short supply. The development of local manurial resources, is a long term measure. It involves bringing about a change in attitudes of farmers which is not quick in accomplishment. Conservation of cattle manure and farm wastes is inter linked with the fuel problem of villages. The green manure practice bristles with the problems of seed supply, cattle trespass and moisture availability. The urban compost campaign is dependent on the transport bottleneck from the town to the village. Improved cultural practices are not spectacular in effect and require, patient and painstaking effort over long periods. The spread of the Japanese method of paddy cultivation depends upon the quantity of fertilizers made available in time. Planting paddy wide requires heavier fertilisation to produce high yields. It is therefore very necessary to adopt closer spacing and earlier plantings both of which are known to contribute to higher yields in

our State. These are extensively adopted by the Chinese farmers with increased production of the order of about 17 per cent. Plant protection measures are already being willingly adopted by cultivators due to the development of the wonder insecticides, B.H.C., D.D.T., and allied products. Extensive use is only a question of arranging timely supplies of the suitable pesticides, equipment and technical services in an increasing measure.

In none of the measures so far adopted including land reforms are there incentives which will attract the farmer and encourage him to get the best out of his labours. Prices alone can do this whether he be a land owner or tenant. Guaranteed prices and efficient marketing systems should have high priority if production is to be increased to meet the existing and future demand for food. Fixed prices to be effective should be announced well in advance of the cultivation season to enable the cultivators to adjust their expenses to prices and should be remunerative enough even to sub-marginal cultivators. When food is in short supply, even the sub-marginal producers are to be encouraged by suitable price policies and subsidies if total food supply is not to decrease. The recent prices announced for paddy in Tanjore District do not seem to have satisfied even the marginal cultivators. The more important production requisites viz., the cost of labour and fertilizers, have not shown any tendency to fall in recent years. The price of Sulphate of Ammonia — the most useful fertilizer for giving assured increased production—has increased by 22 per cent or more between 1954 to 1958. The labour costs have not increased relatively in money value but indirectly through decreased efficiency of labour. Consumers' angle seems to influence more in the fixation of prices. While it is true that view point has also to be considered, the production aspect should have a dominant part, as decreased production will only increase consumers' troubles.

Tiller and Main Shoot Relationship in *Setaria Italica* Beauv., (Tenai or the Italian Millet)

By

CHARLES RATNASWAMY

Introduction : The economic importance of the tillering habit in cereals is not new to the plant breeder and studies on the inter-relationship between the tillers and the main culms of cereals have received some attention in the past. In *Setaria italica* Beauv., (the Italian Millet) three high yielding strains Co. 1 and Co. 3 with free tillering and Co. 2 with stray-tillering habits have been evolved by pure line selection at the Millets and Pulses Breeding Station, Coimbatore. Work done on the inheritance of this habit has indicated that it is not only hereditary but also influenced by environment to certain extent (Charles Ratnaswamy 1956-'57). The tillers not only develop from the base of the main culm but also from the nodes higher up on the main culm and the tillers. In the early stages of growth whenever the basal nodes come in contact with the soil, the roots from this region are induced to grow and function as normal ones and the axillary buds from the basal nodes develop into tillers. The tillers which develop from the base have direct contact with the soil through the adventitious roots developed later from their basal nodes, whereas those which develop from nodes a few inches above, do not contact the soil through roots. In a free-tillering variety the total number of tillers produced may be upto fifteen and varieties which do not tiller are also common. Interest in the possibilities of improving the productive capacity of a crop has increased during the recent years and the primary object of the plant breeder being to exploit the resources of yield potential of a particular crop, a study on the fundamental aspect of the tillering habit in *Setaria italica* Beauv., was taken up to find out information which can be focussed on the improvement of this crop.

Review of Literature : Engledow and Wadham (1924), in their investigations of yield in barley, surmised from more or less circumstantial evidence that tillers may be independant units after the early stages of growth. Godbole (1928) in his studies on the Bajri crop had recorded the possibility of a greater portion of axillary shoots among tillered plants than among those without tillers. He observed that the environment which favoured tillering may also favour branching, or it may be that plants which tended to produce tillers also tended to produce the axillary shoots. Dungan (1931) had found that tillers or 'suckers' of corn under some conditions contributed to grain production of the main stem. Further, he had shown that suckers can contribute to the nourishment of the main stem when the latter had been stripped of its leaves. Smith (1933) had studied the physiological relationship between the tillers and the main stem of wheat plant and had come

to the conclusions that translocation between the culms after the flowering period was possible, but was probably unimportant in the normal plant. Water from the roots was distributed evenly between all tillers irrespective of individual tillers to which roots were directly attached. Leaf blades, stem and ear of a culm each contributed about equally to the dry matter in the grain. Bartel *et al* (1935) found evidence that plant juices in Dwarf Hegari move from the main stalk to the tillers or from the tillers to the main stalk, depending upon where the nutritional deficiency occurred. Rosenquist (1941) had recorded in corn that tillers depended upon the main stalk for their very subsistence and as a consequence dry weights of both main stalks and tillers were greatly reduced when tillers of plants were covered to exclude light and prevent photosynthesis. Labanauskas *et al* (1956) have studied the inter-relationship of the tillers and the main stems in oats and concluded that the undisturbed main stem of oats was not affected materially by tillers, although translocation of nutrients can take place under certain conditions, viz., when blades were removed from the main stem or tillers, and when panicles were removed and blades remained intact. Defoliated tillers benefited from an undisturbed main stem in order of their age. Further they have observed that the performance of any stem appeared to be influenced by the favourable conditions surrounding other stems of the same plant.

Although literature on the inter-relationship of tillers and main culm is available, no work seems to have been done on the variation between the different types of tillers and the relationship of the tillers which do not have direct contact with soil through roots with regard to yield, to the main culm and tillers on which they develop, in any of the cereals and this is the first instance wherein a report on such an investigation in *Setaria italica* Beauv., (the Italian millet) is presented.

Materials and Methods: The details of origin and habit of growth of strains chosen for this study are given in Table I.

TABLE I

Strain No.	Origin.	Habit of growth.
1. Co. 1	Mosu Tenai of Coimbatore	Tillering.
2. Co. 3	Perum Tenai of Coimbatore	Tillering.

Both Co. 1 and Co. 3 take about 50 days to flower. The tillering varieties begin to tiller from 18 to 20 days after the seed germinates.

The studies reported in this paper were conducted in 1956 (summer season) at the Millets and Pulses Breeding Station, Coimbatore. The seeds were sown in the field during the first week of April and the crop was harvested towards the end of July. Detachment of the tillers from the main culms was done by cutting with a scissor. Defoliation was done with the scissor, cutting the leaf blades close to the sheath. The flowering dates for each plant were recorded and as the crop matured, the maximum height, length of the main panicle and length of the fourth internode and leaf in centimeters and the weight of the main panicle in grams were recorded. The grain from each panicle was stripped separately and the weight of the dry grain in grams was recorded.

Experimental data: *Experiment I.* To investigate the relationship of the rooting tillers to the main culm, the following experiment was laid out. Early in the tillering stage of the crop a total of 100 plants with three such tillars which have root contact with the soil were chosen in both the strains Co. 1 and Co. 3. The tillers were detached in a group of fifty plants leaving the rest for comparison. Whenever fresh shoots developed from the treated plants, they were cut and removed. After the crop matured, the quantitative characters were measured to find out the variation in growth between the normal and the treated plants. Table I and II present the data taken in this regard.

TABLE I

Treatment I. Variation between the treated and the control plants of Co. 1 (Mean of 50 plants)

Characters of main culm.	Control	Treated.
1. Maximum height in cms.	90.14 ± 1.21	105.23 ± 1.36
2. Length of the main panicle in cms.	9.67 ± 0.41	11.12 ± 0.52
3. Weight of the main panicle in cms.	3.02 ± 0.08	2.31 ± 0.07
4. Weight of the grain from main panicle in gms.	1.20 ± 0.10	1.40 ± 0.06
5. Length of the fourth internode in cms.	6.91 ± 0.57	8.01 ± 0.52
6. Length of the fourth leaf in cms.	35.23 ± 0.72	38.91 ± 0.81
7. Days to flower.	64.50 ± 0.15	66.20 ± 0.12

TABLE II

Treatment I Variation between the treated and the control plants of Co. 3. (Mean of 50 plants)

Characters of main culm	Control	Treated
1. Maximum height in cms.	97.65 $\pm$ 1.33	111.27 $\pm$ 1.65
2. Length of the main panicle in cms.	13.95 $\pm$ 0.40	14.96 $\pm$ 0.50
3. Weight of the main panicle in gms.	257 $\pm$ 0.09	3.32 $\pm$ 0.10
4. Weight of the grain from main panicles in gms.	1.72 $\pm$ 0.06	2.21 $\pm$ 0.07
5. Length of the fourth internode in cms.	7.45 $\pm$ 0.59	8.70 $\pm$ 0.50
6. Length of the fourth leaf in cms.	39.45 $\pm$ 0.82	43.29 $\pm$ 0.80
7. Days to flower	62.39 $\pm$ 0.16	64.00 $\pm$ 0.12

Experiment II: To investigate the relationship of the tillers which have no contact with the soil through roots to the main culm, the following experiment was laid out. Early in the tillering stage of the crop a total of 150 plants with two such tillers alone was chosen in both the strains Co. 1 and Co. 3. These tillers were detached in the first group of fifty plants and the leaf blades of these tillers were detached in the second group of fifty plants leaving the rest for comparison. After the crop matured the quantitative characters were measured to find out the variation in the growth between the normal and the treated plants. Tables III and IV present the data taken in this regard.

TABLE III

Treatment II Variation between the treated and the control plants of Co. 1 (Mean of 50 plants)

Characters of main culm	Control	Treated	
		Tillers detached	Leaves of tillers detached
1. Maximum height in cms.	91.12 $\pm$ 1.01	90.68 $\pm$ 1.10	85.34 $\pm$ 1.34
2. Length of the panicles in cms.	10.10 $\pm$ 0.36	9.81 $\pm$ 0.36	7.24 $\pm$ 0.33
3. Weight of the main panicle in gms.	2.10 $\pm$ 0.09	2.07 $\pm$ 0.07	1.60 $\pm$ 0.07
4. Weight of the grain from main panicle in gms.	1.24 $\pm$ 0.06	1.21 $\pm$ 0.07	0.98 $\pm$ 0.08
5. Length of the fourth internode in cms.	6.72 $\pm$ 0.49	6.82 $\pm$ 0.55	5.34 $\pm$ 0.51
6. Length of the fourth leaf in cms.	34.96 $\pm$ 0.76	35.25 $\pm$ 0.75	33.12 $\pm$ 0.73
7. Days to flower	64.40 $\pm$ 0.16	64.51 $\pm$ 0.14	66.12 $\pm$ 0.12

TABLE IV

Treatment II Variation between the treated and the control plants of Co. 3. (Mean of 50 plants)

Characters of main culm	Control	Treated	
		Tillers detached	Leaves of tillers detached
1. Maximum height in cms.	98.13 $\pm$ 1.26	99.01 $\pm$ 1.10	92.92 $\pm$ 1.22
2. Length of the main panicle in cms.	14.02 $\pm$ 0.38	14.51 $\pm$ 0.40	10.13 $\pm$ 0.42
3. Weight of the main panicle in gms.	2.59 $\pm$ 0.09	2.61 $\pm$ 0.08	2.01 $\pm$ 0.08
4. Weight of the grain from main panicle in gms.	1.55 $\pm$ 0.06	1.56 $\pm$ 0.09	1.19 $\pm$ 0.10
5. Length of the fourth internode in cms.	7.50 $\pm$ 0.61	7.48 $\pm$ 0.59	6.01 $\pm$ 0.46
6. Length of the fourth leaf in cms.	38.96 $\pm$ 0.82	38.26 $\pm$ 0.79	36.13 $\pm$ 3.83
7. Days to flower	62.50 $\pm$ 0.14	62.60 $\pm$ 0.16	63.45 $\pm$ 0.20

Discussion: Engledow and Wadham (1924) have used the term 'tiller' to describe all the side shoots from the main stem. The main stem was thus not regarded as a 'tiller'. Accepting this usage of the word 'tiller', the American word 'culm' has come into use to describe the ear-bearing stems, including the main stem. The two terms thus overlap, but the main stem was not classed as a 'tiller' and tillers which fail to bear ears were not classed as culms. Godbole (1924) in his studies on the bajri (*Pennisetum typhoides*) crop has termed the basal side shoots as the tillers, as differentiated from the main stem and other side shoots which develop above the soil surface as the axillary branches. In *Setaria italica* Beauv., the basal side shoots root and have direct contact with the soil whereas the side shoots which develop from the nodes above the ground level do not root and as such have no contact with the soil directly. From the present investigation it will be seen that there is definite difference between these shoots in the physiological behaviour. When the former were detached, the main culm showed an increased growth whereas in the case of the other types of shoots which have no contact with the soil separately when detached, the main culms showed neither increased nor decreased growth. But when the leaf blades of such shoots were detached, the growth of the main culm was reduced. Although both the types of shoots can be grouped as tillers, it would appear more reasonable as is seen from the physiological behaviour, to classify the former, i. e., the shoots which develop at the basal culm and have root contact with the soil, as the *primary tillers* and the latter i. e., those which develop from the nodes above the soil surface and which have no contact with the soil separately as the *secondary tillers* (Figure 2).

TABLE V

Proportionate development of secondary tillers with primary tillers in the strain Co. 3 (summer 1957)

Plants with no. of secondary tillers																		Total
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
Plants with no. of primary tillers	0	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	20	
	1	22	2	...	...	...	...	...	...	...	...	...	...	...	...	...	24	
	2	44	14	5	...	...	...	...	...	...	...	...	...	...	...	...	63	
	3	76	2	1	...	2	...	...	...	...	...	...	...	...	...	...	81	
	4	90	20	12	2	...	2	...	...	...	...	...	...	...	...	...	126	
	5	94	18	9	9	...	1	...	...	...	...	...	...	...	...	...	131	
	6	98	18	3	3	7	1	2	...	...	...	1	...	...	...	...	133	
	7	56	12	14	8	3	...	...	...	2	...	...	...	...	...	1	96	
	8	36	16	7	2	4	...	1	...	...	...	1	...	...	...	1	68	
	9	34	6	11	6	5	1	1	...	...	...	...	...	...	1	...	65	
	10	16	6	2	1	2	1	...	...	...	...	...	...	...	...	...	28	
	11	16	8	12	5	2	3	...	...	...	...	...	...	...	1	...	47	
	12	6	4	1	2	4	1	...	...	...	...	...	...	...	...	...	18	
	13	4	4	9	3	2	1	...	...	...	...	...	...	...	...	...	23	
	14	6	4	1	1	1	...	...	...	...	...	...	...	...	...	...	13	
	15	6	2	5	2	1	...	...	...	...	...	...	...	...	...	...	16	
	16	...	2	...	1	1	...	...	...	...	...	...	...	...	...	...	4	
	17	...	...	1	1	1	...	2	...	...	...	...	...	...	...	...	5	
	18	...	2	1	3	...	...	...	...	...	...	...	...	...	...	...	6	
	19	...	...	1	1	1	...	...	...	...	...	...	...	...	...	...	3	
	20	...	...	1	1	1	...	...	...	...	...	...	...	...	...	...	3	
	21	...	2	...	1	...	2	...	...	...	...	...	...	...	...	...	5	
	22	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	
	23	...	2	1	1	...	1	2	...	...	...	...	...	...	...	...	7	
	24	...	...	1	1	1	1	...	1	...	...	...	...	...	...	...	5	
	25	...	...	1	...	1	...	...	1	...	...	...	...	...	...	...	3	
	26	...	...	...	1	...	...	...	...	...	1	...	...	...	...	...	2	
	27	...	...	...	1	...	...	...	...	...	1	...	...	...	...	...	2	
	28	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	
	29	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
	30	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	
Total	624	144	100	56	39	15	8	2	2	4	2	...	...	2	2			

Proportionate development of primary and secondary tillers : From the data presented in Table V it will be seen that the plants with greater number of primary tillers favour the production of secondary tillers. As Godbole (1928) has recorded in the case of Bajri, perhaps availability of more nutrition for proper development favour the production of both the types of tillers.

Primary and secondary tillers as related to the main culm : From a perusal of the data presented in Tables I and II it will be seen that the amounts of grain produced on the main culms with detached primary tillers were 16.7% and 28.5% more in Co. 1 and Co. 3 respectively than that produced on the main culms with tillers undisturbed. In the case of a normal plant, the evidence for the translocation of food materials from the tillers to the main culm and vice versa is difficult to determine under field conditions. However, the data from this experiment suggest that the main culm is able to utilise the food materials drawn from the soil by the roots of the primary tillers. When the secondary tillers were detached the main culm showed neither increased nor decreased growth. But when the blades were removed from these tillers the main culm showed decreased growth, as it was deprived of a part of its grain-forming materials required by its defoliated secondary tillers. The losses in grain weights by the main culm, due to the defoliation of the secondary tillers, were 21% and 20.8% in the case of Co. 1 and Co. 3 respectively. From this evidence it is reasoned that the secondary tillers develop from the nodes with the extra nutrients left unutilised by the main culm. About 45 to 50 days after the germination of the seed, the secondary tillers commence to develop. But the primary tillers develop earlier by about 18 to 20 days after the seed germinates. In the case of the primary tillers, immediately after the tillers develop from the basal culm the roots also develop simultaneously from the base of the respective tillers. Hence the primary tillers are able to utilise the nutrients drawn from the soil by their own roots.

Practical application of the finding : Early in the tillering stage of the crop, the primary tillers were detached with a few roots and transplanted to study the tillering behaviour. The production of primary tillers was much less, but each of the transplanted tiller developed more than four secondary tillers. It is concluded that with suitable environment, production of secondary tillers can be improved to increase the ultimate yield of a particular plant. Such increased availability of nutrients with favourable conditions of growth may correspondingly increase the productive capacity of the plant. Recent studies conducted on the subject of plant response to different types of soils of varying fertility have indicated the close relationship of root and shoot development to the soil fertility (Charles Ratnaswamy, 1956). The present study indicates the possibility of obtaining increased yield in the tillering varieties of Tenai by manuring the crop with readily available plant nutrients.

Summary : The tillering varieties of Tenai (*Setaria italica* Beauv.) have been noted to produce two different types of tillers and the present studies have been made to determine the variations between them. The side shoots developing from the basal nodes of

the main culm and which have root contact with the soil separately are termed as the *primary tillers* while the shoots developing a little above the base and which remain without root contact with the soil separately are termed as the *secondary tillers*. Availability of more nutrition for proper development favours the production of both the type of tillers. The primary tillers, after the formation of their own adventitious roots, function independently. But the main culm gets the benefit of the plant nutrients absorbed by the roots of the primary tillers when it is not required by the latter. The secondary tillers develop from the nodes with the extra nutrients left unutilised by the main culm or the primary tillers from which they grow. It is suggested therefore, that more yield can be obtained from the tillering varieties of Tenai by manuring the crop with more of readily available nutrients.

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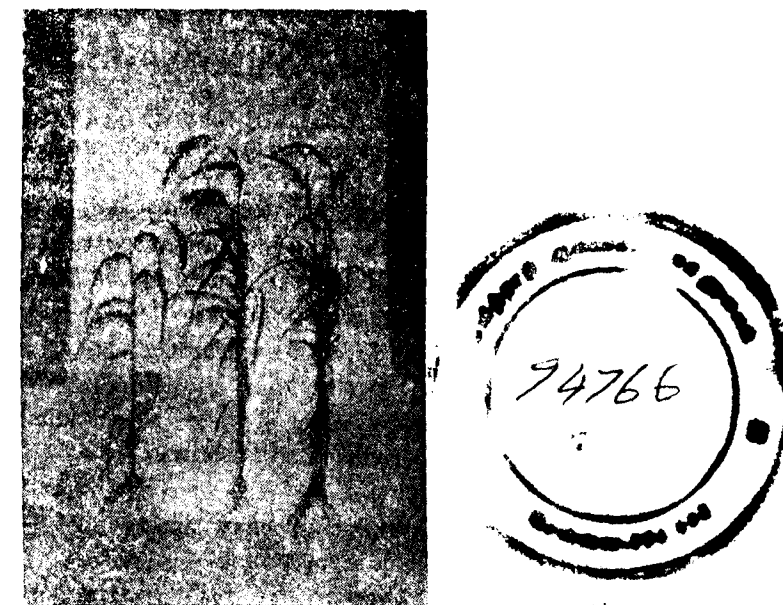


FIG. 1. Tenai plants showing variation in tillering.

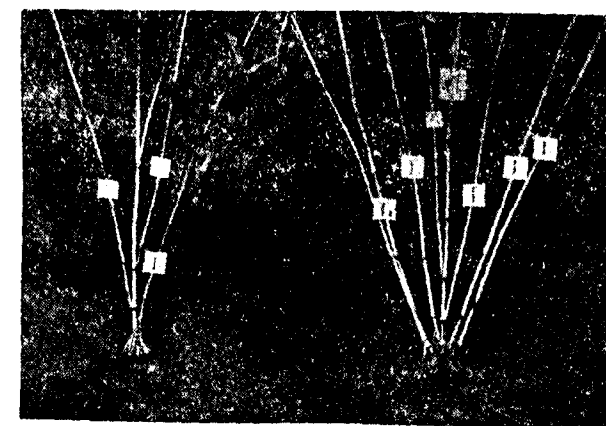


FIG. 2. Two Tenai plants spread out to show the different types of tillers.

M — Main Culm.

T1 to T6 -- Primary tillers.

A1 to A3 -- Secondary tillers.

Preliminary studies on the influence of depth of placement of potato seed on yield

by

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Introduction : For cultivated crops, the depth at which the seed material is placed in the soil has an important bearing on growth and ultimate yield. While placement of the seed at a depth desirable to ensure optimum germination varies from crop to crop, it is also influenced by various factors such as the size of seed and its viability, the physical nature of the soil, the slope of the terrain and the extent of rains received after sowing. Very small-sized seeds would require only a thin layer of soil as cover and, if sown deeper, may result in low germination and loss of stand. At the same time, the soil cover, while admitting easy emergence of the plumule on germination, should be good enough to protect the germinating seed from direct rays of the hot sun or the beating effect of sharp showers. Correct depth of sowing is that one which ensures the optimum soil-cover for seed against climatic factors, and facilitates easy germination and firm anchorage for the developing young plants.

In potato particularly, the placement of seed assumes special significance. Being a soft tuber with a thin skin and sensitive 'eyes', if placed very near the surface soil, the tuber tends to 'greening' and 'sun-burn' due to exposure to sun-light, and may also be easily picked up and eaten by rodents. In addition, the eyes that are not in direct contact with soil may fail to sprout and develop. Since the crop is cultivated on steep slopes, a sudden burst of rain, which is not uncommon in the region, may carry away the top tubers, resulting in loss. Normally, the tuber takes a long period of nearly three weeks to emerge out of the soil, and therefore, the depth of planting should be such as to offer the maximum guarantee against loss by the factors mentioned above.

The ryots in the Nilgiris, generally plant the seed tubers at a depth of about four inches in the furrows made with the '*gudali*', a local digging implement like pickaxe. At the Agricultural Research Station, Nanjanad, where bullock-drawn ridging implements are in use, the average depth of planting varies between six and eight inches.

Review of literature : In Florida, one of the important potato-growing centres of the U. S. A., the practice is to plant the seed tubers at one to two inches below the soil surface. Fifield (1), in his

studies in Florida region, concluded that depth of planting had no relation to yield and that there was the probability of securing higher yields from such shallow plantings in years of adequate soil moisture than during dry periods, while Hardenberg (2) recorded increased yields and less sun burn by adopting a depth of three to four inches in light soils. Lorenz (3), secured higher total yields with four to six inches depth than with nine inches; while the total yields from the two-inch planted plots were only slightly lower than those from the plots planted four to six inches deep, the return of 'ware' (marketable produce) was much less in the former, due to greater sun-burn. Moore (4), working on problems relating to soil and plant response to cultivation methods for potato, found, that deep planting speeded the rate of come-up, which he ascribed to the greater and better distribution of soil moisture in the lower layers.

Materials and methods : In the absence of any definite data on the optimum depth for planting potato, and to prescribe the best one suited to soil and weather conditions obtaining locally, preliminary trials were conducted at the Agricultural Research Station, Nanjanad, during two crop seasons, in the years 1949 and 1950. The soil on which potato is raised in the Nilgiris, is sandy red loam, highly acid (PH. 4.6) and poor in organic matter. The different treatments for depth consisted of four levels viz., two inches, four inches, six inches and eight inches in the second crop season of 1949, and five levels viz., ground level, two inches, four inches, six inches and eight inches in the main crop season, 1950. While for the former trials (1949), only the yield figures were taken into account, in the main crop season (1950), detailed records of crop-growth, such as the sprouting percentage, the mean height, number of tillers and sun burnt tubers, for the different treatments were noted. The size of each plot was an eighth of a cent and each treatment was replicated four times. The data are presented in the following table.

TABLE I. (Second crop, 1949).

Summary of results.

Treatments	Depth of planting				G.M.,	S.E.,	Z. Test.	CD(P=0.05)
	2" (A)	4" (B)	6" (C)	8" (D)				
Acre yield in lbs.,	3000	3500	3700	4400	3650	358	Satisfied.	814
Percentage on general mean.	82.2	95.8	101.3	120.5	100.0	9.8		22.3

Conclusion : D, C, B, A,

TABLE II. (Maincrop, 1950).

Treatments	Depth of planting					G.M., S.E., Z-Test. CD(P=0.05)		
	G.L. (A)	2" (B)	4" (C)	6" (D)	8" (E)			
Acre yield in lbs.,	6800	7000	9600	11600	7000	8400	1201	Satisfied 2612
Percentage on general mean.	80.9	83.3	114.3	138.1	83.3	100.0	14.3	31.2

Conclusion: D, C, B, E, A

TABLE III. (Main crop 1950).

Depth of planting	Percentage of sprouting	Mean height in inches per plant	Mean No. of tillers per plant	Mean No. of sun burnt tubers per plot.
A. Ground level	92.1	6.4	2.1	86
B. 2"	86.7	6.7	1.9	76
C. 4"	95.3	6.6	2.2	44
D. 6"	94.5	6.9	2.0	37
E. 8"	84.3	6.6	2.0	37

Discussion: During the second crop season of 1949, the yields of plots, sown at the depths of six inches and eight inches were better than those from the plots planted nearer the surface, while for the main crop season of 1950, the six inches depth treatment was the best. There was practically no difference for sprouting percentage between four-inch and six-inch depths. Vigour of growth, as reflected by mean plant height, was the maximum for six-inch depth of planting. While rate of tillering exhibited no striking differences among the five treatments, 'sun-burn' was, definitely the least, for six inch and eight inch depths, showing a steady progressive increase for the treatments nearer the soil surface.

The rolling terrain and the sharp slopes over which potato is cultivated in the hills necessitate the use of implements in such a way as to involve the least strain on the animals. Ploughing to greater depths without proportionate increase in yields would only mean so much waste of labour. Again, the soils are generally shallow, overlying a bed of laterite at a depth of a foot or slightly more. Deep working of such a soil may result in loss of the fine top-soil in course of years, as a result of erosion by wind and rain.

The results of the preliminary trials indicate that a depth of six to eight inches is optimum for planting the potato seed tuber. Ploughing to a depth of about six inches is fairly easy with cattle, and the uneven level of the land makes deeper field operations also difficult. At the same time, placing the seed too near the surface is not desirable, as it may expose the developing tubers to attack by tuber moth, as has been recorded by others. Further, the common weeds of the region like Spurry and Polygonums are all surface rooted and therefore, even intercultivation for weeding need not be deep.

Summary: Under Nilgiri conditions, taking into account, the aspects of ease of cultivation crop growth, minimum injury by 'sun-burn' and tuber moth attack and ultimate yield, a safe rule would be to plant the potato seed tuber at a depth of about six inches below the soil surface.

Acknowledgment: The experimental data included in this paper form the results of work during the years 1949 and 1950, and were collected from the relevant records and reports of the Agricultural Research Station, Nanjanad. The authors' thanks are due to Sri K. Hanumantha Rao and Sri P. Uttaman, the former Superintendents of the Station for their valuable guidance, and help in the conduct of the investigations.

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Research Notes

Control of crabs (*Paratelphusa hydrodromus* H.) in rice fields

Crabs often assume serious proportions and damage the rice crop a short period after planting. In South India, Ramachandra Rao and Susainathan (1923) mention of the damage caused by crabs and deal with various methods of control such as use of crab pots, wire netting of heavily tenanted plots, fumigation of burrows with potassium cyanide, poison baiting with paris green mixed in rice bran and molasses, etc. Venkataraman (1929) and Ramakrishna Ayyar (1940) also recommend trapping with crab pots set along the edge of water channels. Advancing further, Thirumala Rao and Santhanaraman (1954) recommend the use of warfarin for tackling the pest. The author of this note has had opportunities during 1955 to make some observations on the damage caused by the pest and its control by the use of insecticides at the Agricultural Research Station, Aduthurai. The observations made are recorded herein.

Nature of damage by crabs: Crabs cut tender transplanted seedlings at ground level and drag cut bits into their borrows. In attacked fields, cut leaves and bits are seen floating in large numbers on the water surface. During 1955, crab menace was found to be severe on 'Samba' crop planted in September. The peak damage was experienced in about two weeks after planting. The attack was worst in fields where proper drainage was not practicable.

Control Measures: During the course of trials against the rice stem borer (*Schoenobius incertellus* Wlk) at the Agricultural Research Station, Aduthurai, certain insecticides were found to be highly lethal to crabs, frogs, fish and snakes too. The possibility of exploiting such insecticides in tackling crab menace was explored by conducting a trial with Parathion 0.025% (Folidol 1 oz. in 12½ galls.), Endrin 0.01% (1 oz. of 19.5% emulsifiable concentrate in 12½ galls.), Toxaphene 10% and 20% dust and BHC 10% dust. Each insecticide was applied in a 40 cent field on 21-9-1955. A large belt of untreated area was provided between the two treatments so as to avoid mixing up of treated water in one field with that in the other. Flow of water from one field to another was prevented so that the insecticidal action was confined to the treated field alone. After 72 hours, water was drained off and the population of dead and live crabs in evidence was counted. The data gathered are furnished in the table below.

Crab mortality due to insecticidal treatments.

Treatment	Population of Crabs		Percentage of dead specimens
	dead	alive	
(1)	(2)	(3)	(4)
1. Parathion (Folidol) 0.025% spray	38	7	84.4
2. Endrin 0.01% spray	23	9	71.9
3. Toxaphene 20% dust	48	20	70.6
4. Toxaphene 10% dust	29	16	64.4
5. BHC 10% dust	16	16	50.0
6. Control	Nil	61	Nil

Folidol caused the maximum kill of crabs. Endrin and Toxaphene also brought about a very high mortality. The treatments arrested further damage to the crop and proved to be far superior to BHC in efficacy.

Conclusion: Encouraging indications for the successful adoption of potent chemicals against crabs have come to light. This line of tackling the pest is easier and more effective than older methods and as such, marks a decisive improvement in the control of crabs. Folidol followed by Endrin and Toxaphene 20% proved to be the most effective. The cost of chemicals for treating one acre works out to Rs. 4.00, Rs. 12.00 and Rs. 15.00 in the case of Endrin, Folidol and Toxaphene 20% respectively; Endrin being the cheapest.

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A note on clarificants for Gur.

Gur making is an important cottage industry in India. In Gur, it is the quality which determines the price and it depends upon the chemical composition of the juice, type of furnace and pan employed and the method of boiling and clarification adopted. Apart from the use of improved appliances and the general technique of boiling the juice, clarification and particularly the clarifier used, affect the quality of gur to a great extent. (Gosh-1946-Jour. Ind. Chem. Soc. Ind. and News Ed. 9, 82).

Various clarificants are used in this country in the different States. Lime is popular in Madras and Andhra States. Lime with superphosphate is popular in Bombay. In some parts of India vegetable clarificants like juice of Bendai (*Hibiscus esculentus*) are being used. (Roy.-S. G.-1951-'Gur Monograph', Indian Central Sugarcane Committee). In Trichy, Salem and Coimbatore districts of this State hydros (Sodium hydrogen sulphite) is used. There is a marked improvement in colour by the use of this salt, but the keeping quality of the gur is affected. It has been reported from Bihar (Khanna, K. L. and Chakravarthi, A. S.-1955-'Scientific Monograph on Gur', Indian Central Sugarcane Committee) that the process of clarification of juice by a water extract of groundnut seed or castor seed showed outstanding results. It has also been reported that gur prepared by using soyabean tablets (Soyabean flour supplemented with a small amount of monocalcium phosphate) was found to be superior to that obtained with the use of castor seed extract. Work done at Anakapalle (Mohan Rao and Narasimhan-1954-'Clarificants in jaggery making—a review'—Second Biennial conference of Sugarcane Research and Development workers pp. 574—579.) indicated that the gur obtained by clarification with both castor seed and groundnut seed extracts was poorer, compared to the normal lime treatment. A similar study was made at the Sugarcane Research Station, Gudiyattam, during the year 1956—'57 and the results are presented in this note.

Lime was added in three doses to raise the pH of the boiled juice to 6.1, 6.4 and 6.7. In the case of groundnut seed and castor seed extracts three concentrations were tried, viz. 4 ozs., 6 ozs. and 8 ozs. of seed in 1 gallon of water. Soyabean tablets were tried at the rate of 60 tablets in 1 gallon of water and 90 tablets in 1 gallon of water. The trials were carried out with the juice of Co. 419 as well as Co. 449. The samples of gur from the various treatments were examined for their quality and the percentage of recovery of gur was also noted.

The analytical data obtained from the trials made by using the clarificants under study are given in Tables (I) and (II).

TABLE I
Results of clarification studies made with juice of Co. 419 Cane

S. No.	Clarificant	Amount of clarificant added	pH before addition of clarificant	pH after addition of clarificant	percentage of recovery of gur on wt. of juice	Quality of gur obtained		
						Colour	Taste	Consistency
1	Lime	to pH 6.1	5.5	6.1	17.18	Fair	Sweet	Hard
2	Lime	to pH 6.4	5.5	6.4	17.18	Good	Sweet	Hard
3	Lime	to pH 6.7	5.5	6.7	17.79	Black	Saltish	Hard
4	Groundnut seed extract	4 oz. in 1 gallon	5.5	5.5	17.79	Fair	Sweet	Soft
5	Groundnut seed extract	6 oz. in 1 gallon	5.5	5.5	17.79	Fair	Sweet	Soft
6	Groundnut seed extract	8 oz. in 1 gallon	5.5	5.5	18.13	Fair	Sweet	Soft
7	Castor seed extract	4 oz. in 1 gallon	5.5	5.5	19.02	Fair	Sweet	Soft
8	Castor seed extract	6 oz. in 1 gallon	5.5	5.5	17.45	Fair	Sweet	Soft
9	Castor seed extract	8 oz. in 1 gallon	5.5	5.5	18.41	Fair	Sweet	Soft
10	Soyabean tablets	60 tablets in 1 gallon	5.5	5.5	17.18	Fair	Sweet	Soft
11	Soyabean tablets	90 tablets in 1 gallon	5.5	5.5	19.32	Fair	Sweet	Soft

TABLE II
Results of clarification studies made with juice of Co. 449 cane

S. No.	Clarificant	Amount of clarificant added	pH before addition of clarificant	pH after addition of clarificant	Percentage of recovery of gur on wt. of juice	Quality of gur obtained		
						Colour	Taste	Consistency
1	Lime	to pH 6.1	5.5	6.1	18.13	Fair	Sweet	Hard
2	Lime	to pH 6.4	5.5	6.4	18.13	Good	Sweet	Hard
3	Lime	to pH 6.7	5.5	6.7	18.13	Dark	Sweet-saltish	Hard
4	Groundnut seed extract	4 oz. in 1 gallon	5.5	5.5	19.32	Fair	Sweet	Slightly soft
5	Groundnut seed extract	6 oz. in 1 gallon	5.5	5.5	19.63	Fair	Sweet	Slightly soft
6	Groundnut seed extract	8 oz. in 1 gallon	5.5	5.5	19.94	Fair	Sweet	Slightly soft
7	Castor seed extract	4 oz. in 1 gallon	5.5	5.5	17.79	Fair	Sweet	Slightly soft
8	Castor seed extract	6 oz. in 1 gallon	5.5	5.5	17.45	Fair	(bad flavour)	Slightly soft
9	Castor seed extract	8 oz. in 1 gallon	5.5	5.5	19.32	Fair	(bad flavour)	Slightly soft
10	Soyabean tablets	60 tablets in 1 gallon	5.5	5.5	18.13	Fair	Sweet	Slightly soft
11	Soyabean tablets	90 tablets in 1 gallon	5.5	5.5	19.32	Fair	Sweet	Slightly soft

It is seen from the tables that liming to a pH of 6.4 gave gur of good colour and hard consistency, while liming to pH 6.7 resulted in a dark coloured product. The other vegetable clarificants, viz., groundnut seed, castor seed and soyabean extracts gave gur of light colour but the gur was soft. There was no appreciable difference in the percentage of recovery of gur among the different clarificants tried. The addition of the vegetable clarificants did not affect the pH of the juice at all.

The behaviour and effect of the different clarificants were similar in the case of juice of the variety Co. 419 as well as that of Co. 449.

Conclusions : Of the various factors on which the quality of gur depends, the clarificant used plays a very important role. Clarification efficiency of different clarificants was tested and their effect on the quality of gur was studied. Compared to groundnut seed and castor seed extracts, lime gave better clarification of juice resulting in a product of hard consistency.

Gur prepared by the addition of lime to a pH of just 6.4 was not only hard but also of good colour.

The effect of the different clarificants were similar in the case of juice of both Co. 419 and Co. 449.

Agricultural College and
Research Institute,
Coimbatore-3

N. M. THYAGARAJAN,
DR. A. MARIKULANDAL.

Effect of insecticides on the Indian Honey Bee.

Cherian and Mahadevan (1946) noted the toxic effect of DDT and B. H. C. on the Indian honey bee — *Apis indica* F. under hive conditions. Subsequently, a number of chlorinated hydro-carbons and organophosphates have come into use as insecticides for the control of various crop pests. Preliminary observations on the toxic effects of these at their usual dosages on the Indian honey bee — *Apis indica* — were made as and when opportunities occurred and the following findings recorded.

Observations were made on Cucurbitaceous plants and cotton which attracted a large number of bees for their nectar. The plants incidentally also got the benefit of cross-pollination by bees. The pesticides used against Cucurbits were (1) Endrin — 1 oz. in 4 gallons of water (2) Basudin-wettable powder and emulsion — 1 oz. in 2½ gallons and

1 oz. in 4 gallons respectively (3) Isodrin spray — 1 oz. in 1½ gallons and dust 2% and (4) Folidol — 1 oz. in 12½ gallons. Bees were collecting nectar from the flowers in the morning and an average of 2 to 3 bees were seen in a flower between 8 and 10 A. M. In the morning when the insecticides were applied bees visited both the treated and control plants but in fewer numbers in the former and as time advanced, the numbers gradually declined and were reduced to nil in the treated plants. On the succeeding two days, there were no visits of bees, after which the normal foraging activity was resumed. In the case of the control, bees continued to visit and collect nectar. A study of the relative repellent effects of the chemicals taking into consideration the number of bees visiting the individually treated plants revealed that Folidol, Basudin wettable powder and Endrin were more or less tolerated than others.

The cotton crop was treated with (1) Basudin emulsion — 1 oz. in 6½ gallons (2) Folidol spray — 1 oz. in 12½ gallons and (3) Endrin — 1 oz. in 12 gallons of water for the control of boll worms. Bees were noted visiting the cotton crop in the morning and collecting nectar from extra floral nectaries situated at the outer margin of the calyx when the treatments were being given. After treatment, the foraging activity was normal both in Basudin and Folidol treated plots; but the bees seemed to avoid the plot treated with endrin. After 10 A. M. when cotton flowers commenced blossoming, bees were collecting nectar from floral nectaries also. In the same afternoon, the repellent action of the chemical acted to a certain extent and only stray bees were seen over the treated crops, but the next day the foraging activity was restored to normal in all.

The studies made so far have indicate that bees avoid visiting the plants treated with insecticides for one or two days after the actual application though not at the time of application during which period they are already on the foraging errand. The actual mortality of bees occurring as a result of the contact of the insecticides could not be reckoned as there was no instantaneous death, but it might be advisable that insecticidal treatments for the control of pests are applied either before the blossoming or after fading of the flowers for the day, especially of the bee pasturage plants.

Agricultural College and
Research Institute,
Coimbatore-3.

V. MAHADEVAN.

REFERENCES

M. C. Cherian and
V. Mahadevan

1946 Preliminary trials with DDT and gammexane against the Indian Bee *Apis indica* F. Indian Bee Journal, Volume VIII Nos. 9 to 10.

College and Estate News

Paul D. Karunakar Memorial Cup: In the Inter Collegiate Elocution Competition for the Karunakar Memorial Rolling Cup, five local Colleges. The Nirmala College won the Cup.

Athletics: In the open competition for 1500 metres race conducted by the Government College of Technology, our College athlete Sri Shenaya won the first prize.

Tours: The Final Year students were on an educational tour of Kangayam, Hosur, Bangalore and Mysore from 6th February to 26th February.

Refresher Course: The first batch of Agricultural Extension officers deputed for Refresher Course from Mysore, Kerala and Madras States underwent the training for one month from 19-1-1959 at the Agricultural College and Research Institute, Coimbatore.

Study Group: Dr. Axel Nygren Sweden, delivered a lecture on "Apomixis in Angiosperms" to the members of the study group. Dr. Nygren is a co-worker of Arne Muntzing and Gustafsson and has made detailed studies on *Calamagrostis*. Dr. Bhat, Director of Sugarcane Breeding Institute, presided and Dr. Stubbs of West Germany also participated.

Upper Subordinates' Association: At a General Body Meeting of the Association held on 10th February it was decided to remind the Government once again to kindly grant advance increments in the revised scale of pay at the rate of one for every two years of service to those who were already in service.

Farm News

Waste turned into wealth—compost from paddy husk:

The ten million tons of paddy husk available in our country every year, need not remain a waste, agricultural experts point out. A good, yellowish, powdery manure, rich in plant foods, can be prepared from this waste product. The manure contains, the experts point out, one per cent nitrogen, 1.6 per cent phosphoric acid, one per cent potash and 2.9 per cent calcium, and will be a welcome addition to our half-starved soils.

The method of converting paddy husk into manure is simple, and can be followed by any farmer. The husk is spread in the cattle shed in a ten inch layer. Over this, about nine inches of paddy straw or any other litter is spread. The top layer is renewed from time to time. But not so the husk layer. It remains there for about six weeks, after which it is removed and put into a pit and composted. After about nine months, the paddy husk forms an excellent compost ready for use.

[F. I. U. No. 1/59 N. Delhi.]

Cotton Diseases can be checked by simple precautions:

Many of our farmers are now following some simple precautions for checking the disease of the cotton crop. They are now careful not to stock the cotton stalks after harvest if there had been an attack from one or more diseases on the crop. They pull out the stems immediately after harvest and burn them. Along with the stems, they also destroy all shed leaves, flowers and bolls. Research has found new varieties that resist attack from Wilt, a common disease of cotton in many areas. But for other diseases like Blackarm and Root Rot, no disease-resistant varieties are yet available, and hence the farmers will have to take other measures to check these diseases.

Intercultivating a legume like MOTH, which covers the soil and prevents the soil temperature from rising, is one good way of checking the Root Rot disease. Patches in which the disease has appeared should also be isolated, and in these cotton should be rotated with some other crop. For Blackarm and Anthracnose diseases, treating the seed with a chemical before sowing has given good results. In all cases where a disease has appeared, it pays farmers to show the disease-affected plants to the Agricultural Officer of the area so that he may identify the disease and suggest how it can be controlled.

[F. I. U. No. 2/59 N. Delhi.]

Weather Review — for January, 1959.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January 1959
North	Madras (Moenambakkam)	0.0	— 1.4	0.0
	Tirurkuppam*	0.0	— 1.0	0.0
	Vellore	0.0	— 1.5	0.0
	Gudiyatham*	0.0	— 1.6	0.0
East Coast	Palur*	0.0	— 0.8	0.0
	Tindivanam*	0.1	— 0.7	0.1
	Cuddalore	0.2	— 2.2	0.2
	Nagapattinam	0.4	— 2.3	0.4
	Aduthurai*	0.4	— 0.9	0.4
Central	Pattukkottai*	0.9	— 0.8	0.9
	Salem	0.0	— 0.3	0.0
	Coimbatore (A. M. O.)*	£ 0.0	— 0.4	0.0
	Coimbatore	0.0	— 0.6	0.0
South	Tiruchirapalli	0.3	— 0.5	0.3
	Mathurai	0.1	— 0.7	0.1
	Pamban	1.5	— 1.1	1.5
	Koilkattai*	0.3	— 0.6	0.3
	Palayamcottai	0.7	— 1.0	0.7
	Ambasamudram*	0.8	— 2.0	0.8
Hills	Nagercoil*	0.0	— 0.5	0.0
	Kodaikanal	1.5	— 1.7	1.5
	Coonoor*	0.8	— 2.2	0.8
	Ootacamund*	0.0	— 0.7	0.0
	Nanjnad*	0.0	— 0.4	0.0

* Meteorological Stations of the Madras Agricultural Department.

£ Actual Rainfall 0.01".

Dry weather prevailed over the entire State during the first thirteen days of this month. On 14-1-1959 scattered showers occurred in south Madras State, followed by fairly widespread rains on the next day. On 16-1-1959 showers occurred locally in south Madras State and at a few places in north Madras State. On the following day mainly dry weather prevailed except for scattered showers in south Madras. The spell of dry weather continued thereafter till 30-1-1959. On 31-1-1959 showers occurred at a few places in south Madras.

There is no noteworthy rainfall in January 1959.

The details of the zonal rainfall are furnished hereunder:

Zonal rainfall (in inches)			
Name of Zone	Rainfall for January, 1959	Departure from normal	Remarks.
North	Nil,	— 1.4"	Far below normal
East Coast	0.3"	— 1.3"	"
Central	0.1"	— 0.5"	"
South	0.6"	— 1.2"	"
Hills	0.2"	— 1.0"	"

The summary of the south-west monsoon rainfall during the period June to September, 1958 is given below:

There was abnormal delay in the onset of the monsoon over the country in 1958 and consequently the rainfall during the month of June, was 52% below normal over the entire Madras State. After the advance, the activity of the monsoon was maintained at an even pace till the end of the season. The rainfall in the Madras State during July also was much in deficit to the extent of 49%. During the first two weeks of August, 1958 rainfall was widespread in Madras State with locally heavy rains, and rainfall was well over 50% above the normal. Subsequently nearly normal rainfall was received in the remaining two weeks. For the entire State rainfall during August was 40% above normal. The rainfall during the first two weeks and the last week of September was far below normal in Madras State while it was above normal during the third week of September, 1958. For the entire month of September rainfall was 44% below normal. On the whole the rainfall during the south-west monsoon period of 1958 was 26.3% below normal in Madras State, this deficiency being the highest of all the other parts of India. Further, the distribution was uneven with its associated ill effects on the cultivated crops.

Agricultural Meteorology Section,
Lawley Road Post, Coimbatore-3.
23th January, 1959.

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

Gleanings

Living Fertilizers: Useful micro-organisms with which the soil is fertilized and which increase the yield are often called living fertilizers. A number of new valuable bacterial fertilizers have been evolved in the U. S. S. R., recently. Phosphoro-bacterine and nitrogen, for instance, have won a good reputation. They are designated for grain and legume crops.

It has been established that even in the arid climate of the Steppe areas of Siberia and Kazakhstan, phosphoro-bacterine increases the wheat yield by at least 3—5 centners per hectare. It has also been noted that it improves the wheat's resistance to ailments and facilitates the accumulation of protein in the grain. Nitrogen considerably accelerates the growth and maturing of legume crops. Of great interest are the combined preparations. They contain 2 to 3 varieties of micro-organisms and can be successfully applied to diverse agricultural crops.

Plastics improve soil: Long chain molecules, similar to those used in producing plastics, have proved to be the key to making "structureless" soil able to bear good crops.

Joint research by Soviet chemists and agricultural experts has shown that clay will form clods when treated with a solution containing chain molecules.

Already good grain yields have been obtained on clay soils treated in this way at Prigorodny State Farm, and this year new tests will be made in cotton fields in Uzbekistan.

[From Agriculture and its mechanisation in the Soviet Union Vol. IV. No. B. January, 1959.]

Departmental Notifications

Gazetted Officers—Madras Agricultural Department.

Postings and Transfers during the month of February 1959.

Name and Designation	Posted or transferred to
Sri T. R. Narayanan, Plant physiologist, Coimbatore	Professor of Plant Genetics, Regional post graduate Research Institute, Coimbatore
„ D. Shanmugasundaram, Deputy Director of Agriculture, Madras	State Marketing Officer, Madras
„ B. Santhanakrishna Naidu, State Marketing officer, Madras	Deputy Director of Agriculture, Tanjore
„ S. Venkatachalam, Assistant in Chemistry	Promoted as Asst. Agricultural Chemist Sugarcane Res. Station, Cuddalore
„ C. K. Rajagopalan, Assistant in Chemistry	Promoted as Asst. Agricultural Chemist, (Groundnut storage Scheme), Coimbatore
„ S. Gopalakrishnan, A. A. C., Groundnut Storage Scheme, Coimbatore	Groundnut Physiologist (A. A. C.), Coimbatore
„ C. S. Sankaranarayanan, D. A. O., Sattur	Permitted to retire
„ K. M. Narayanan, D. A. O., Nagarcoil	Posted as D. A. O., Sattur
„ R. Krishnamurthy, D. A. O., on leave	Posted as D. A. O., Nagarcoil
„ A. Shanmugasundaram, Assistant Paddy Spl. Coimbatore	Granted earned leave for 30 days from date of relief
„ A. Subramaniam, Asst. Millets Spl. Coimbatore	To be in addl. charge during the above period
„ C. R. Subramaniam, Addl. Asst. Agrl. Engineer, (Head Quarters)	On deputation under the Government of India
„ C. S. Sridaran, Agricultural Engineer.	To be in addl. charge of both (1) Head Qrs. A. A. E., and (2) Addl. A. A. E., Head Quarters.
„ C. S. Krishnan, Spl. Asst. Cotton Spl. (Khadi Scheme), Tirupur	Assistant Cotton Spl. (Karunganni Scheme), Koilpatti
„ V. Sethuraman, Assistant Cotton Specialist, (Karunganni Scheme), Koilpatti	Spl. Assistant Cotton Specialist, (Khadi Scheme), Tirupur
„ K. Saptharishi, Supdt. A. R. S., Bhavanisagar	Granted extension of earned leave for 28 days from 21—2—1959

Upper Subordinates—Agricultural Department
Postings and Transfers during the month of February 1959.

Name and Designation	Posted or Transferred to
Sri K. K. Anantanarayanan, Fruit Assistant, Periakulam	Fruit Assistant, Kallar-Burliar
„ V. Lakshmanan, Horticultural Asst. College Orchard, Coimbatore	Assistant, Sim's Park, Coonoor
„ P. S. Ranganathan, Asst. Parasite Breeding Station, Gudiyatham	Resignation accepted from date of relief.
„ N. Ganesan, P. P. Asst. Vellore	Assistant, Parasite Breeding Station, Gudiyatham
„ V. Sivasubramaniam, Cotton Asst. Srivilliputhur	Cotton Assistant, Aduthurai, in place of Sri R. Rajagopala Rao resigned.
„ N. Rajamani	Appointed as Chemistry Asst. A. C. & R. I., Coimbatore
„ Kumari M. Radha	Do. Do. Do.
„ V. Krishnamurthy, Agronomy Asst. Sugarcane Research Sub Station, Kulithalai.	Sugarcane Asst. Sugarcane Zonal Farm, Lakshmangudi
„ A. K. Kadirvelu, Sugarcane Asst. Lakshmangudi	Agronomy Assistant Sugarcane Research Station, Kulithalai
„ V. N. Kalyanaraman, Entomological Asst. Coimbatore.	Office of the Grain purchase officer, Erode
„ P. M. Srinivasan, Do. Do.	Do. Mayuram
„ U. Kamalaksha Naick, Chemistry Asst. Coimbatore	Do. Do.
„ V. Ganesan, P. P. Asst. Tanjore District	Do. Tanjore
„ V. Kumaran, Agri. Demonstrator, Villivakkam	Soil Conservation Asst. Tiruvellore Scheme



Review on market conditions of commercial crops in the notified areas for the month of January, 1959.

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

Tirupur : Coimbatore District : Season : There was no rain during the month in this district. Pickings of Cambodia and Karunganni cotton kapas in Palladam and Avanashi taluks will commence during the first fortnight of February. It is reported that there was a good demand for superior quality cotton during the period.

Arrivals and transactions : Lint : During the month under report the market started with an opening balance of 5411 candies of Cambodia and 1317 candies of Karunganni lint. The total arrivals in to the market were 3062 candies of Cambodia and 273 candies of Karunganni lint which included 958 candies of Cambodia lint locally ginned. Despatches from Tirupur accounted for 5318 candies of Cambodia and 1346 candies of Karunganni lint. At the end of the month there was a closing stock of 3154 candies of Cambodia and 244 candies of Karunganni lint.

Kapas : The market for kapas started with an opening balance of 5867 pothis of Cambodia and 30 pothis of Karunganni kapas. During the month under report the total arrivals into Tirupur market were 5115 pothis of Cambodia and 44 pothis of Karunganni. During the period the disposals were 8230 pothis of Cambodia and 64 pothis of Karunganni kapas. At the end of the month the market closed with a balance of 2752 pothis of Cambodia and 10 pothis of Karunganni kapas.

Prices : The average prices of Cambodia and Karunganni lint during the January 1959 and December 1958 were as detailed below :

Prices in Rs. Lint in candy of 784 lbs.

	Lint:	
	January, 1959.	December 1958.
Cambodia superior quality	Rs. 981—00	Rs. 982—00
„ average „	Rs. ...	Rs. ...
Karunganni superior „	Rs. 866—00	Rs. ...

Kapas per pothi of 280 lbs.

	Kapas:	
	January, 1959.	December 1958.
Cambodia superior quality	Rs. 145—00	Rs. 152—62
„ average „	Rs. 120—00	Rs. 136—50
Karunganni superior „	Rs. ...	Rs. ...

Ramanathapuram district: Season: The rains received in the month were insufficient. However it is reported that the conditions of standing crop of Karunganni cotton was fair. Pickings of cotton have commenced in certain places in the district.

Arrivals and transactions: Opening stocks, arrivals, disposals and closing stocks to kapas and lint in the important markets in the district were as extracted below:

Kapas in pothis of 280 lbs.

Name of Market	Opening balance	Arrivals	Disposals	Closing stock
Virudhunagar		2150	2150	...
Sattur		...	...	...
Rajapalayam		1250	1250	...
Total		3400	3400	...

Lint in candies of 784 lbs.

Virudhunagar	... 120	215	285	50
Sattur		...	...	...
Rajapalayam	... 130	125	155	100
Total	... 250	340	440	150

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

Kapas in pothi of 280 lbs.

	January 1959.		December 1958.	
	Rs.	...	Rs.	...
Karunganni New	Rs. 103—110		Rs. 89—96	
Karunganni Old	Rs. 84—112		Rs. ...	

Lint in candy of 784 lbs.

Karunganni	... Rs. 676—771	Rs. 675—751
Karunganni kodai	... Rs. 656—716	Rs. ...
Tinny	... Rs. 621—666	Rs. 647—670
Uganda Certified	... Rs. 1400	Rs. 1636
Uganda Uncertified	... Rs. N. T.	Rs. 1086—1136
Cambodia	... Rs. 900—971	Rs. ...

Cotton Seeds in Maund of 82 2/7 lbs.

Karunganni	... Rs. 13.72—17.95	Rs. ...
Cambodia	... Rs. 12.09—12.41	Rs. ...

N. B.:— N. T = No Transaction.

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

South Arcot District: Groundnut Kernels: Arrivals from the district produce amounted to 5971 tons and receipts from other districts to 1301 tons. Import from other States accounted for 13 tons. The market exported 3 tons to other States. 3499 tons were despatched to other districts during the month by the market. Consumption by oil mills and country chekkus came to 4476 tons and 308 tons respectively. Wastages were calculated at 378 tons. The trade closed with a stock of 2153 tons at the end of the month.

The prices of kernels and oil were reported to be on the increase due to announcement of Export quotas.

The fluctuation in the prices in the several markets varied from Rs. 147.70 to 168.90 per candy of 531 lbs. according to quality and prices of oil ranged between Rs. 265—275 per candy of 500 lbs in different assembling markets in the district.

North Arcot District: Season: There was no rain during the month. It is reported that the harvest of groundnuts has been completed throughout the district by the beginning of the month.

Arrivals and transactions: Opening stocks, arrivals, disposals and closing stocks were as detailed below:

Quantity in Tons:

Kind of Crop	Opening stock	Arrivals	Disposals	Closing stock
Groundnut pods	... 1224	2520	2410	1334
Groundnut kernels	... 753	2026	2095	684

Prices: Though the prices of groundnut kernels opened on a moderate tone, it closed at high levels at the end of the month. The following were the range in prices of groundnut pods, kernels, oils, oilcakes in different markets in the district during the month.

January, 1959.

Groundnut pods (per bag, of 80 lb.)	Rs. 8.25—22.00
Groundnut kernels (Cdy. of 531 lb.)	Rs. 113.10—178.00
Groundnut oil (Cdy. of 500 lbs.)	Rs. 275.00—335.00
Groundnut oilcake (Md. of 82 2/7 lb.)	Rs. 8.12—20.00

Ramanathapuram District: Arrivals and Transactions: The following were the arrivals and disposals of pods and kernels during January, 1959.

	Opening stock	Arrivals	Disposals	Closing balance
Pods (in tons) ...	500	2600	2600	500
Kernels (in cdy. of 531 lbs.)	4640	10600	8000	7240

Prices: The following were the prices of pods, kernels, oil and oilcake during the month.

January, 1959.

Groundnut pods (Bag of 82 2/7 lbs.)	Rs. 18—21
Groundnut kernels (Cdy. of 531 lbs.)	Rs. 156—180
Groundnut Oil (Cdy. of 500 lbs.)	Rs. 286—325
Groundnut Oilcake (Md. of 82 2/7 lbs.)	Rs. 9.63—11.70

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

South Arcot District: Arrivals of gingelly from district produce and other districts accounted for 749 bags and 271 bags respectively. Despatches to other districts like Salem, Coimbatore and Madras came to 196 bags. Consumption by mills and country *chekkus* were 173 bags and 712 bags respectively. The closing stock with the trade stood at 1383 bags.

Prices were reported to be steady during the month. The average price per bag of 168 lbs. is Rs. 60—62.

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

Coimbatore District: Arrivals and transactions: There was no rain during the month. The condition of standing crop of tobacco is reported to be fair and harvesting of the crop has just commenced.

At the end of the month under report there was a stock of 11,525 candies of chewing and 260 candies of cheroot tobacco. About 1690 candies of chewing and 90 candies of cheroot tobacco were exported to places in Salem, Madurai, Ramanathapuram, Tirunelveli, Tanjore, Trichy, North Arcot in Madras State and Kerala, Mysore, and Andhra States and other Northern States.

The market for tobacco was dull during the month under report. The following were the prices for tobacco:

Prices in Rs. per candy of 500 lbs.

Variety	I Grade	II Grade	III Grade
1. Chewing tobacco (Sun-cured):			
(a) Meenampalayam	370—460	200—320	120—185
(b) Other varieties	260—360	185—250	115—185
2. Cheroot varieties:			
Sun-cured grown in Erode and Bhavani taluks	260—440	210—250	120—200
3. Chewing tobacco:			
Pit-cured grown in Palladam and Sulur areas.	250—300	160—200	90—130

Cardamom: Madurai District: It is reported that there was a light rainfall in Cardamom plantation areas in Madurai district.

Arrivals of Cardamom in different assembling centres in Madurai district and in Virudhunagar were reported to be fair. Despatches of cardamom from Bodinaickanoor to North Indian cities like Bombay, Calcutta, Delhi, Kanpur, Amritsar etc., and to Tuticorin and Cochin ports for export to continental ports and London were reported to be fair.

The estimated arrivals and stock positions of Cardamom during January, 1959 were as extracted below:

Name of Market.	Quantity in lb.		
	Estimated Arrivals.	Estimated Despatches.	Estimated closing stock.
1. Bodinaickanur	... 2,53,000	2,63,000	50,000
2. Thevaram	... 20,000	25,000	30,000
3. Pannaipuram	... 15,000	10,000	20,000
4. Kombai	... 9,000	15,000	20,000
5. Uthamapalayam	... 7,000	7,000	10,000
6. Cumbum	... 35,000	25,000	1,10,000
7. Gudaloor	... 7,000	12,000	20,000
8. Pattiveeranpatti	... 38,000	37,000	9,000
9. Virudhunagar	... 47,000	51,000	14,000
Total	... 4,31,000	4,45,000	2,83,000

Prices: The minimum and maximum prices of Cardamom that prevailed during January, 1959 for different qualities in different markets were as detailed below :

Name of Market	Trade Variety	Prices per lb.
(a) Bodinaickanoor :		
	(1) Superior Bulk	Rs. 9.09 to 9.57
	(2) Medium Bulk	" 7.94 to 8.70
	(3) Inferior Bulk	" 7.00 to 8.11
	(4) Seeds (Inferior)	" 9.46 to 10.15
(b) Pattiveeranpatti :		
(1) Sun dried :		
	Superior and Bold	Rs. 9.00 to 9.44
	Medium and bulk	" 8.60 to 8.85
	Inferior and small	" 8.34 to 8.56
(2) Store green :		
	Superior and bold	" 9.04 to 9.45
	Medium and bulk	" 8.60 to 9.08
	Inferior and small	" 8.10 to 8.58
(3) Seeds		" 10.45 to 11.71
(c) Virudhunagar :		
	(1) Bold quality	" 9.50 to 9.75
	(2) Superior	" 9.00 to 9.75
	(3) Medium	" 8.25 to 8.75
	(4) Inferior	" 7.50 to 7.75
	(5) Seeds	" 11.50 to 11.75

Review of administrative activities of market committees during January, 1959.

General: The Market Committees of South Arcot, North Arcot, Coimbatore and Trichirapalli continued to function during the month under report. Efforts are being made to revive the activities of the Market Committees of Ramanathapuram and Tirunelveli after the disposal of the cases 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 (1)		Section 6 (3)		Weighmen	
	A	B	A	B	A	B
South Arcot Market Committee	675	675	436	436	409	409
North Arcot Market Committee	333	333	321	321	136	136
Coimbatore Market Committee	143	143	115	115	25	25
Tiruchy Market Committee	112	112	65	65	33	33

A = Licences issued during the month.

B = Licences issued upto the end of the month.

Meetings: An ordinary meeting of North Arcot Market Committee for 1959 took place on 29-1-1959 at Vellore and 25 subjects were discussed.

A meeting of Trichirapalli Market Committee was held on 19-1-'59 at Jayakondacholapuram and 13 subjects were discussed.

No meeting was held in other Market Committees during the month under report.

Quality Analysis: Nil.

Quality Competition: Nil.

Crop and Trade Reports

Onions — First Forecast Report — 1958-'59: The area sown with onions in the Madras State upto 25th December, 1958 is estimated at 23,600 acres. Compared with the area of 23,600 acres estimated for the corresponding period of the previous year, the current year's estimate shows an increase of 0.4 percent. As compared with the average area of 21,400 acres calculated for the five years ending 1957-'58, the present estimate is an increase of 10.3 percent. The area estimated is the same as that for the previous year in the districts of Chingleput, Tanjore, Ramanathapuram and the Nilgiris. A decrease in area is estimated in the districts of South Arcot, North Arcot and Tirunelveli and an increase in all the other districts of the State, except Kanyakumari district, where the area under the crop is little or negligible.

The seasonal factor for the State as a whole works out to 97 percent of the normal as against 96 percent of the normal for the previous year. On this basis, the total yield works out to 115,200 tons, as against 114,600 tons estimated for the corresponding period of the previous year representing an increase of 1.1 percent. As compared with the average yield of 103,460 tons calculated for the five years ending 1957-'58, the current year's yield shows an increase of 11.4 percent. The wholesale price of onions per standard maund of 82.27 lbs or 3,200 tolas as reported from certain market centres on 9th January, 1959 was Rs. 5.88 in Coimbatore, Rs. 3.47 for first sort and Rs. 2.74 for second sort in Tanjore Rs. 4.26 in Madurai. Compared with the prices which prevailed in the corresponding period of the previous year, these prices reveal a decrease of 61.9 percent for II sort, 57.8 percent for I sort at Tanjore, 51.2 at Madurai and 33.3 percent at Coimbatore.

Mesta — Second and Final Forecast Report — 1958-'59: The area sown with mesta in the Madras State during 1958-'59 is estimated at 820 acres. Compared with the area of 870 acres estimated for the corresponding period of the previous year, this is a decrease of 5.7 percent. Compared with the average area of 860 acres calculated for the five years ending with 1957-'58 the present estimate shows a decrease of 4.7 percent. An increase in area is estimated in districts of North Arcot, Tanjore and Tirunelveli and a decrease in Coimbatore, Tiruchirappalli and Madurai districts. The seasonal factor for the State as a whole works out to 94 percent of the normal which is the same as that for the previous year. On this basis the total yield in terms of dry fibre works out to 1159 bales of 400 lbs, as against 1540 bales of 400 lbs estimated for the corresponding period of previous year, and the average yield of 1560 bales of 400 lbs calculated for the five years ending with 1957-'58 representing a decrease of 5.8 percent and 7.1 percent respectively.

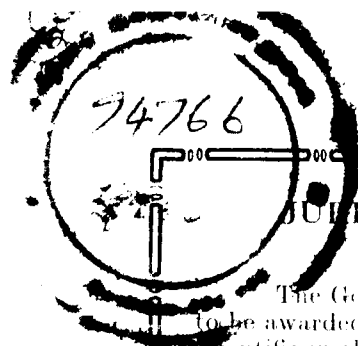
Sugarcane—Second Forecast Report—1958-'59: The area under sugarcane in the Madras State upto the end of September 1958 is estimated at 99,550 acres (80,220 acres under planted crop and 19,330 acres under ratoon crop). Compared with the area of 98,100 acres (85,050 acres under planted crop and 13,050 acres under ratoon crop) estimated for the corresponding period of the previous year, the present estimate is an increase of 1.3 percent. Compared with the average area of 90,800 acres calculated for the five years ended with 1957-'58 this is an increase of 9.4 percent. A decrease in area is estimated in South Arcot and Salem districts. The area estimated is the same as that for the previous year in Chingleput district. An increase in area is estimated in all the other districts of the State except the Nilgiris and Kanyakumari where the area under the crop is little or negligible. The crop has been affected to some extent due to insufficient rainfall in parts of North Arcot and Salem districts and due to attack of *Pyrilla* in Karur taluk of Tiruchirappalli district. The condition of the crop was generally satisfactory in the other districts of the State.

The seasonal factor for the State as a whole works out to 94 percent of the normal which is the same as that for the previous year. On this basis, the total yield works out to 25,00,840 tons of cane, the gur equivalent of which is 275,660 tons as against 24,91,600 tons of cane, the gur equivalent of which is 275,050 tons estimated for the corresponding period of the previous year, representing a slight increase in the yield. Compared with the average yield of 258,540 tons of gur calculated for the five years ended with 1957-'58, the present estimate shows an increase of 6.4 percent. The average wholesale price of jaggery per standard maund of 82.2-7 lb or 3,200 tolas as reported from important market centres on 10-10-1958 was Rs. 18.81 in Tiruchirappalli, Rs. 18.00 in Vellore, Rs. 17.28 in Cuddalore and Rs. 17.05 in Coimbatore. Compared with the prices which prevailed in the corresponding period of the previous year, these prices show an increase of 40.0 percent in Cuddalore, 28.1 percent in Vellore, 28.0 percent in Tiruchirappalli and 13.8 percent in Coimbatore.

The Madras Agricultural Students' Union.

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JUBILEE SHIELD FOR CHEMISTRY

The Golden Jubilee rolling shield of the Chemistry Section to be awarded during the College Day and Conference to the best scientific workers in the field of Agricultural Chemistry.

Rules and conditions for the award:

- (1) The shield will be awarded to the best scientific worker in the field of Agricultural Chemistry. All Scientific workers and Research Students of the Chemistry Section at the Agricultural College and Research Institute, Coimbatore as well as in the Department of Agriculture, Madras State will be eligible for the award.
- (2) The shield is a rolling one and will be award at the time of the Annual College Day and Conference of the Agricultural College and Research Institute every year.
- (3) A committee to adjudge the best worker for the award shall comprise.
 - (1) The Principal (Chairman — Ex-Officio)
 - (2) The Government Agricultural Chemist (Ex-Officio)
 - (3) A senior officer of the Research Council elect, by Research Council.
- (4) The award will be made to the worker adjudged as the best on the basis of the reports or papers containing either (i) an account of original research in which the author's share is the maximum or (ii) a critical discussion or analysis of any subject related to agricultural chemistry, throwing new light on or adding new knowledge to the subject.
- (5) A certificate will also be awarded to the winner of the rolling shield.
- (6) The shield shall be returned to the Government Agricultural Chemist after the award for keeping in safe custody.
- (7) The award will not be made more than once to the same person.
- (8) The power to modify the rules to suit any situation that may arise at any time rests with the Government.

Papers and reports etc. for the award are invited on or before the 15th July 1959 by the undersigned.

Lawley Road P. O.

A. Mariakulandai,
Professor of Soil Science.