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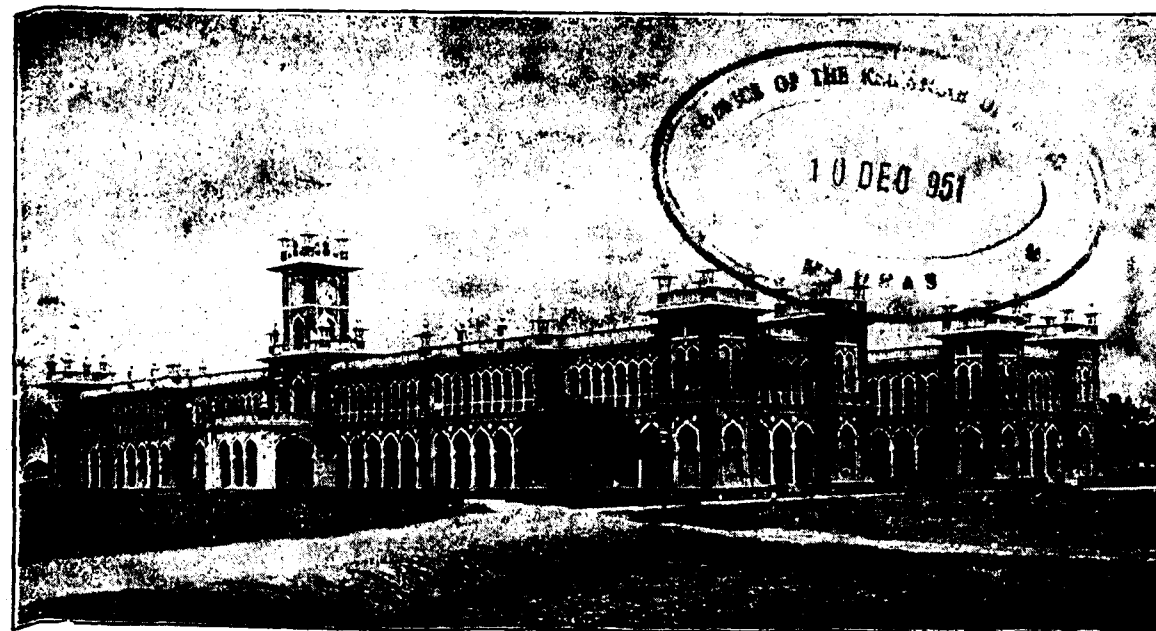
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Announcement

*

There will be an Extra-ordinary General Body Meeting of the Madras Agricultural Students' Union at 4 P.M. on Sunday, the 23rd December 1951 in the Freeman Hall, Agricultural College, Coimbatore, to consider certain changes in the rules and policy of the Union consequent on the following proposals received from the Director of Agriculture, Madras.

1. Grant from the Government.
2. Publication of the abstracts prepared by Research Officers.
3. Copy of the Journal with abstracts to be supplied to all heads offices.
4. Subscription to be charged at the rate of Re. 1/- for non-gazetted staff and Rs. 2/- for gazetted staff.
5. Prior approval of the Director of Agriculture needed for publication of articles.
6. The size of the journal to be not less than 50 pages per issue.
7. The certified copy of the Auditors' report to be submitted to Director of Agriculture every year, for approval.
8. Director of Agriculture should have the power to appoint half the members of the Editorial Board.

K. Kuppamuthu,

23-11-1951,

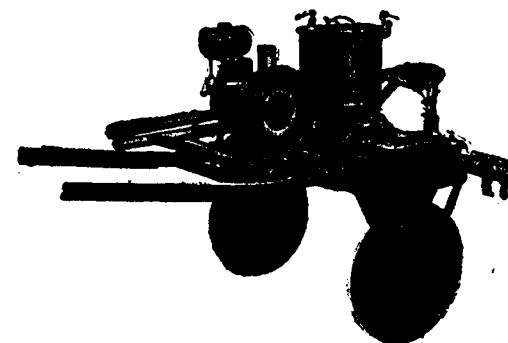
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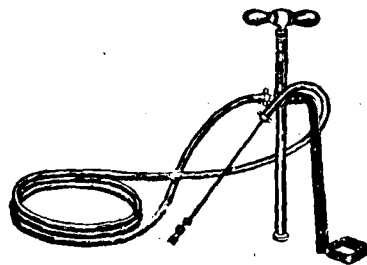
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Vol. XXXVIII

November 1951

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Editorial

Practical Training in Agricultural Education: A proposal has been recently put forward, to include in the curriculum of the Agricultural degree course a period of six months as practical training. This is quite a welcome move. No doubt, the students of the Coimbatore and Bapatla Colleges of Agriculture are made to do all the farming operations, such as ploughing, transplanting, hoeing and harvesting, in the course of their three years at College, but it has become increasingly evident in recent years that a more intensive practical training is necessary before the new graduates can be entrusted with the work of managing an agricultural station or acting as taluk agricultural advisers, to help the farming public.

In the prewar days it was the practice to first train the new graduates under an experienced officer in charge of an Agricultural Research Station for one year and then keep them as understudies with senior agricultural demonstrators for another year, after which alone were they deemed fit to be entrusted with advisory or experiment station work. This system was found very satisfactory from the point of view of departmental efficiency. During the war years however, and subsequently too, food production became such an acute and urgent issue, that the scope and functions of the Agricultural Department had to be enlarged enormously. As a result of this sudden expansion the system of training that existed before had to be given up, owing to a great increase in the demand for agricultural graduates to man the various Grow More Food schemes that were started as part of the food production drive.

The number of agricultural graduates turned out was increased to nearly 190 per year, by opening a second college of agriculture at Bapatla in 1945 and by increasing the number of admissions in each of these colleges. Even with this increase it was not possible to revive the old system of training new hands, with the result that

very often raw graduates had to be placed in positions of trust and responsibility. The result was in some cases not satisfactory and it is now generally conceded that in the interests of efficiency a certain preliminary period of intensive training is quite necessary before the new graduates can be considered fit to hold executive posts in the Agricultural Department.

It is understood that the idea at present is to have a period of six months as practical training, over and above the present curriculum of three years. During these six months, the students would be assigned to different agricultural stations in the State and trained by the officers in charge of those stations, in the day-to-day running of the farm, in maintenance of accounts and scientific records and made familiar with all the agronomic and other experiments that are being carried out in these stations. This type of first-hand acquaintance with the actual running of a model agricultural station would, it is expected, enable the students to gain sufficient confidence in themselves and help in equipping them as agricultural advisers to the farming public later on.

In this context it is pertinent to point out that such a training would prove useful, not only to those who are to be members of the Agricultural Department, but also to those who might look upon agricultural education as an aid in cultivating their own lands in a better manner. In these days of ever-increasing Governmental activities it is desirable to remember that the original intention in starting Agricultural Colleges was not so much to turn out departmental personnel as to enable farmers' sons to do better farming in their own lands and the present proposal for strengthening the practical side of the agricultural course is certainly to be welcomed from this viewpoint as well.

Influence of Seed Size and Spacing on the Yield of Potatoes

By

M. D. AZARIAH, B. Sc., (Ag).

and

K. SAPTHARISHI, B. Sc., (Ag).

Agricultural Research Station, Nanjanad

Introduction: To secure an economic return from any crop, the adoption of an optimum seed rate is important. Apart from the other factors that influence crop-yields, such as manuring and tillage, the return to the cultivator is secured to a great extent by adjustment of the quantity of seed he uses per acre.

Seed rate directly influences the population or stand of the crop, which in turn, influences the ultimate yield. At the same time, a given seed rate cannot be rigidly specified for any particular crop, since it is itself governed by various factors such as (1) the particular variety used; (2) the normal rainfall and other climatic factors of the region; (3) the physical nature of the soil, like its water-holding capacity; (4) the supply of available plant food it contains; (5) irrigation and other facilities and (6) manuring.

As a result of various trials it has been confirmed that in the case of the potato crop, both the two factors, viz., the size of the tuber used as seed and the spacing of the seed in the rows at planting, considerably influence the yield of the crop at harvest. Thus, the need for fixing what may be termed "a safe general rule" for these two factors, with regard to conditions obtaining in the Nilgiris tract, was realised long ago, and experiments covering a series of seasons conducted to this end. The conclusions obtained on these points form the subject of this paper.

To begin with, it has to be admitted that local growers have been rather tardy to adopt the recommendations released as a result of experimentation. But, with the gradual spread of potato cultivation and increase in prices there has been in recent years a welcome change in favour of the use of the proper size of seed material and also its spacing while sowing. Use of very small-sized seed results in the reduction of both the average size of the harvested tubers and the over-all yield which, in turn, depress the commercial value of the produce and the net return to the grower. Optimum seed size and spacing result in a reduction of seed rate and economy in cultivation charges. The recent trends of falling crop-yields and lowering market-prices are largely

attributable to the indiscriminate use of small and ungraded tubers by cultivators, with the resultant production of undersized potatoes that are acceptable to the trader only at prices below par.

Work in India on the subject has been rather limited. By a series of trials at Uttar Pradesh, Mitra, (1), working on the local, small-sized variety, *Phulva*, concluded that seed tubers weighing 1 oz. were the best for getting optimum yields. Burton (2), reported that the average yield per acre was secured by a spacing of a foot between seed, over drills 26" to 28" apart. The most economical sett for production of marketable potatoes was fixed by Whitehead, McIntosh and Findlay (3), as seed weighing about 2 oz. and of the size of a hen's egg. Salaman (4), reviewing the bulk of the work both in England and other countries, concluded that the most profitable crop was derived from seed tubers between 1 oz. and 2 oz. These conclusions have been further confirmed in America by Rosa (5) Stewart (6) and Stuart and his collaborators (7).

In general, experimental evidence in the U. S. A. indicates that within reasonable limits, the larger the size of seed piece used, the higher will be the total yield. The grading adopted by the British Ministry of Food, in the case of tubers saleable as seed, viz., over 1½ oz. and under 2½ oz., in general, reflects the general agreement on the optimum seed size. In the Nilgiris, the ryots use 'chats', that is tubers weighing less than 1 oz. This definitely pulls down the yield. The tempting prices offered to the cultivator immediately after harvest force him to sell off all his produce and even the material he should normally reserve for seed, with the result that he keeps the 'chats' which would fetch anyway only very low prices, for use as seed. It is encouraging to note that the unsoundness of this practice is now being realised and, the necessity for good seed appreciated in a larger measure than hitherto, as a result of work at the Agricultural Research Station, Nanjanad.

Trials at the Agricultural Research Station, Nanjanad, on Seed Size and Spacing: With a view to prescribe the optimum size and spacing, experiments were conducted from 1933 to 1938 at this station. Five different sizes of seed tubers, viz., 1 oz., 1½ oz., 2 oz., 3 oz., and 4 oz., were studied, with three different spacings in the row, viz., 6", 9" and 12". The distance between the rows was kept constant at 27". The variety, Great Scot, was taken up as the material for study, in view of popularity and other desirable characters as uniformly shaped, round, flat eyes, early maturity, good yield and keeping quality.

For the season 1934-'35, three sizes of tubers and three spacings in replicated plots, with the following yields:—

TABLE I
(Treatments and acre yield in maunds of 25 lb.)

Spacing	Size	6 inches			9 inches			12 inches		
		1 oz.	1½ oz.	2 oz.	1 oz.	1½ oz.	2 oz.	1 oz.	1½ oz.	2 oz.
Gross yield	...	781	752	878	602	787	800	574	647	755
Net yield (gross yield minus quantity of seed planted)	...	684	606	684	585	690	671	525	574	659

Conclusion: 2 oz. seed gave decidedly higher yields in all the spacings, and was the best for 6" spacing. But, when the net yield was considered, it was found profitable to use 1½ oz. seed at 9" spacing.

In the years, 1935-'36 and 1936-'37, the following treatments were adopted, using three levels each for seed size and spacing.

TABLE II
Effect of seed size and spacing on tuber yields

Treat- ments	Size	Spacing	1935—'36				1936—'37			
			Main Crop		II Crop		Main Crop		II Crop	
			Gross Yield	Nett Yield	Gross Yield	Nett Yield	Gross Yield	Nett Yield	Gross Yield	Nett Yield
(in maunds of 25 pounds)										
A	... 1 oz.	6"	627	530	409	312	520	423	532	435
B	... 1 oz.	9"	534	469	286	222	470	406	467	392
C	... 1 oz.	12"	483	434	284	235	484	435	453	405
D	... 1½ oz.	6"	712	569	418	273	550	405	616	470
E	... 1½ oz.	9"	651	554	343	246	518	421	556	460
F	... 1½ oz.	12"	546	473	317	245	472	399	466	394
G	... 2 oz.	6"	821	628	551	358	658	464	664	470
H	... 2 oz.	9"	698	569	411	282	606	477	607	478
I	... 2 oz.	12"	693	596	358	261	556	460	461	364
Mean	...		640.3		375.2		537		535	
S. E.	...		26.01		33.4		23.8		15.1	
C. D.	...		75.9		97.4		66.4		33.9	
Z test	Yes or No	}								
Yes or No			Yes		Yes		Yes		Yes	

Note: Nett yield is gross yield—minus weight of seed planted.

Conclusion: The yield increased both with the increase in size of seed and increase in the seed rate. Two-ounce tubers, spaced between 6" to 9", gave economic returns.

During the year 1937-'38, four sizes of seed tubers were tried, with three spacings in the row. The twelve treatments were as follows:—

TABLE III
Effect of seed size and spacing on tuber yields

Treatments	1937-'38.					
			Main Crop		II Crop	
	Size	Spacing	Gross yield	Nett yield	Gross yield	Nett yield
			(in maunds of 25 lb.)		(in maunds of 25 lb.)	
A	... 1 oz.	6"	638	541	629	532
B	... 2 oz.	6"	769	575	747	553
C	... 3 oz.	6"	870	580	841	551
D	... 4 oz.	6"	943	556	958	571
E	... 1 oz.	9"	567	502	523	458
F	... 2 oz.	9"	702	573	630	501
G	... 3 oz.	9"	755	561	712	518
H	... 4 oz.	9"	789	631	782	527
I	... 1 oz.	12"	559	511	514	466
J	... 2 oz.	12"	714	617	531	434
K	... 3 oz.	12"	762	617	609	464
L	... 4 oz.	12"	821	627	637	443
		Mean	741	566	676	501
		S. E.	40.2		35.9	
		C. D.	115.5		99.4	
		Z test				
		Yes or No.	Yes	No	Yes	No

Conclusion: From the results of both crops, it was seen that tubers of 1 oz. to 2 oz. size, spaced 6" to 9" apart, gave the best returns. The growth and vigour of haulms rose with increased size of seed and spacing.

Discussion: During the season, 1934-'35, the results showed that 2 oz. seed gave better results in all the spacings, and proved best with 6" spacing. But, when the nett yield was considered, it was found most profitable to use 1½ oz. seed at 9" spacing in the row. For the next crop-year, it was found that yields rose with the increases in size of seed and seed rate; 2 oz. seed at 6" spacing being the most economical for the season. During later years, gross yields increased with closer spacing and also directly followed the increase in size of seed. 2 oz. seed tubers, spaced 6" to 9" in the row, returned optimum yields.

These results generally agree with the findings of foreign workers who prescribe the optimum size of seed as between 2 oz. and 2½ oz. The larger the seed size, the greater has been the yield, as pointed out by Wakankar and Singh (8). Larger seed produced more sprouts, greater yields and a larger number of tubers per hill. Sanborn (9) has recorded

that close spacing of the plant resulted in a lower percentage of dry matter in the crop. This finding seems quite logical, in view of the partial shading that will occur with closely spaced plants.

Ryots of the Nilgiri district use ½ oz. to 1 oz. tubers, spaced at 4" to 6" in the row, and 18" between rows. These small-sized tubers are often those produced by plants affected by 'mosaic'. The effect of 'mosaic' disease on potatoes is to produce dwarfed, unhealthy plants, which produce mainly small tubers and in consequence, only very poor yields can be expected. By eschewing small tubers and insisting on the ideal seed size for planting, the percentage of 'mosaic' affecting the crop may be brought down considerably. In addition, the cultivator will gather definitely better yields and a greater income per acre.

Summary: Trials conducted at the Agricultural Research Station, Nanjanad, and elsewhere, in India and abroad, show that 1½ oz. to 2 oz. tubers, spaced at a distance of 6" to 9" in the row, and 27" apart from row to row, give the most economic yield. The possibilities of further reducing the distance between rows are to be taken up shortly for investigation.

Acknowledgement: The experimental data included in this paper form the results of the valuable work of V. K. Subrahmanya Mudaliar, during his term as Superintendent of this Station, and the material is gratefully acknowledged.

LITERATURE CITED:

1. Mitra, (1947): ... Improve your potato yields by using bigger size tubers for planting. *Grow More Food Series Leaflet No. 14/1947 of Uttar Pradesh.*
2. Burton, (1948): ... The Potato: A survey of its History and of Factors influencing its Yields.
3. Whitehead, Mc Intosh and Findlay, (1945): ... The Potato in Health and Disease.
4. Salaman, (1926): ... Potato varieties.
5. Rosa, (1922): ... Seed Studies with Irish Potatoes: *University of Missouri, Agrl. Expt. Station Bulletin. No. 191.*
6. Stewart, (1922): ... Potato Seed Experiments: *New York Agrl. Expt. Station Bulletin No. 491.*
7. Stuart, (1924): ... Size of Potato Sets: Comparisons of Whole and Cut Seed: *U. S. Dept. Agric. Bulletin No. 1248.*
8. Wakankar and Singh, (1943): ... The Effect of Spacing and Seed Size on the Yield of Potatoes: *Journal of the American Society of Agronomy, No. 35.*
9. Sanborn, (1891): ... Potato Trials. *Bulletin of the Utah Agri. Expt. Station No. 5.*

A Note on the Effect of Delayed Harvest on the Quality and Yield of Potato

Introduction: At the Nanjanad Agricultural Research Station labour scarcity prevails at the time of the main crop harvest, and makes it necessary to put off part of the main crop harvest to a later date, in order to push through the second crop planting of potato with the limited available labour. This is necessary because early planting alone insures the crop against the danger from December frosts. With a view to find out how long the main crop of potato under the conditions prevailing at this farm could be left unharvested without affecting the quality and the yield after the haulms have dried out, the present experiment was carried out.

Material and Method: Twenty lots of 50 seed tubers in each of uniform size were sorted out from the produce obtained from a main crop plot under Great Scot after the haulms had completely dried up. These were weighed and immediately buried in rows on 15-9-1950 under conditions similar to those of the under-ground tubers of a mature crop remaining un-harvested. Four lots were kept inside the store room on racks as control. The soil temperature was registered at 8 A.M. every day at the tuber level and also the store room temperature. Four random rows of the buried lots were dug out at a time at fortnightly intervals over a period of two months and their weights were recorded, the weight of the control also being recorded each time.

Results: The average weights of the periodically dug out tubers and the soil and the store room temperatures, together with the average soil moisture data at the depth of burial of the tubers, at weekly intervals, are given below:—

TABLE I

Average weights of tubers at fortnightly intervals from the time of burial

Treatments	Average weight of tubers buried on 15-9-'50		Average weight at the time of digging out on					Loss in weight %
	lb.	oz.	29-9-'50	13-10-'50	27-10-'50	10-11-'50		
	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
Control	8	11	8	4	8	0	7	13
								9.8
First batch dug out	7	14	7	13				
								0.4
Second batch dug out	8	5		8	5			
								Nil
Third batch dug out	8	6			8	4		
								1.5
Fourth batch dug out	8	2				8	2	
								Nil

Soil temperature and moisture records from 15-9-'50 to 10-11-'50

Date	Soil temperature (F)	Store temperature (F)	Percentage moisture of soil at weekly intervals
(1)	(2)	(3)	(4)
15-9-50	..	...	27.0
22-9-50	...	...	20.6
27-9-50	62.6°	51.8°	
28-9-50	64.4	60.8	
29-9-50	64.4	60.8	33.2
30-9-50	64.4	59.0	
1-10-50	60.8	59.0	
2-10-50	62.6	59.0	
3-10-50	60.8	59.0	
4-10-50	62.6	59.0	
5-10-50	66.2	60.8	
6-10-50	64.4	59.0	25.0
7-10-50	62.6	66.2	
8-10-50	64.4	62.6	
9-10-50	59.0	57.2	
10-10-50	64.4	62.6	
11-10-50	62.6	55.4	
12-10-50	66.2	60.8	
13-10-50	64.4	62.6	26.9
14-10-50	66.2	60.8	
15-10-50	64.4	60.8	
16-10-50	60.8	59.0	
17-10-50	62.6	59.0	
18-10-50	60.8	59.0	
19-10-50	64.4	59.0	
20-10-50	62.6	59.0	25.2
21-10-50	62.6	59.0	
22-10-50	60.8	59.0	
23-10-50	59.0	57.2	
24-10-50	59.0	57.2	
25-10-50	59.0	57.2	
26-10-50	59.0	57.2	
27-10-50	57.2	55.4	12.7
28-10-50	57.2	55.4	
29-10-50	66.2	62.6	
30-10-50	60.8	57.2	
31-10-50	62.6	60.8	
1-11-50	60.8	57.2	
2-11-50	66.2	62.6	
3-11-50	62.6	60.8	22.4
4-11-50	57.2	55.4	
5-11-50	64.4	62.6	
6-11-50	62.2	60.8	
7-11-50	60.8	57.2	
8-11-50	60.8	57.2	
9-11-50	59.0	57.2	
10-11-50	60.8	57.2	26.1

On 29-9-'50 when the first batch of tubers was dug out, the tubers had little sign of sprouting. The control too had not sprouted. When the second batch was lifted after 28 days from burial, the sprouting had already commenced and was fairly well advanced, the sprouts measuring on an average 3 inches. In the control there were just indications of sprouting. The temperature and moisture content of the soil around this period, it will be noted, are comparatively high. The tubers, when dug out after 42 days, had shoots that had just come above ground. In the fourth batch, when the tubers were unearthed, the shoots that came above ground measured on an average 5 inches. There seems to be little loss due to delayed harvest. The quality of the tuber, however, is bound to deteriorate on account of the profuse sprouting if left unharvested at this period for over a month after the haulms have dried up. The average loss of weight due to shrinkage when kept on racks in the store for 2 months during this part of the year is found to be about 10%. This preliminary experiment has to be conducted on a bulk scale under field conditions for confirmatory tests.

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Virginia Tobacco in Madras State

By
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A notable advance which could be claimed during the past 1½ decades has been the introduction and spread of Virginia tobacco in Guntur, Krishna, East and West Godavari districts. The credit goes to a certain commercial concern which has been the pioneer in the field. The area under Virginia tobacco, which was only 40,000 acres during 1934-'35 has increased to 86,815 acres in 1939-'40 and to 1,34,000 acres during 1948-49. This area represents roughly 90% of the total area under Virginia tobacco in the Indian Dominion. Other improvements consequent on this increase in area in this cigarette tobacco industry were :—

(a) The value of foreign exports increased from 0.63 crores of rupees in 1935-36 to 9.75 crores of rupees, thus forming a large source of foreign exchange.

(b) The number of tobacco flue-curing barns rose from 1599 in 1935 to 16,912 in 1950-'51.

(c) The number of factories for redrying tobacco strips and leaves rose from half a dozen in 1939 with a total capacity of 14,000 lb. per hour to 16 with a total capacity of 39,250 lb. per hour and 5 more with 13,250 lb. capacity per hour are expected to be established in the course of this year.

(d) Increase in the number of cold storage rooms for storing tobacco at 60°F. rose from 3 rooms with a capacity 3 million lb. in 1935 to 11 rooms of 15 million lb. capacity.

(e) Introduction of grading by 'Agmark' system by which 60 to 80 million lbs. are being graded annually.

(f) A tobacco auction floor with capacity to accommodate 1000 bales for auctioning, being the biggest auction floor in the Indian Dominion was opened in January 1951.

(g) Another important milestone in the history of tobacco in India has been the establishment of Indian Central Tobacco Committee by the Government of India in November 1945 to tackle problems of production, research and marketing.

Virginia tobacco was first introduced in the Guntur district and the remarkable increase in area is as shown under :—

Area in acres ¹				
District	1934-35	1939-40	1944-45	1948-49
Guntur	40,000	79,481	67,573	93,818
East Godavari	...	75	8,797	18,281
West Godavari	...	736	12,021	16,239
Krishna	...	5,743	10,680	3,199
Nellore	...	780	478	278
Others	...	...	...	2,502
	40,000	86,815	99,549	134,317

The corresponding production of farm-cured leaf in these years were 30.2 million lb., 72.1 million lb., 74.8 million lb. and 80.5 million lb. respectively.

Supply of tobacco seedlings: At present the seedlings of Harrison Special for Guntur, Krishna, East and West Godavari districts are mostly obtained from commercial nurserymen who raise nurseries (3,782 acres in 1949-'50) ² round about Chirala and Bapatla where the soil is light and sandy and favourable for tobacco nurseries. From these two centres, the seedlings are transported to almost the entire area in the above districts. The work done at the Tobacco Research

¹ From Season and Crop Reports of Madras State.

² From Indian Leaf Tobacco Development Company, Chirala.

Station of the Indian Central Tobacco Committee appears to show that seedlings can be raised as well in black cotton soil, provided the required amount of sand viz. half a ton per acre, is added to lighten the soil.

The cost of seedlings varies according to demand during the season from Rs. Rs. 5/- to 30/- per 1000 seedlings. There appears to be some scope for issuing purity certificate for private nursery men to have control of distribution of pure seeds.

The Madras Agricultural Department and the Indian Leaf Tobacco Development Company are at present distributing pure seeds of Harrison Special No. 9. The Madras Agricultural Department has a scheme by which pure selfed seeds from Agricultural Research Station, Lam Farm, Guntur, are to be taken and two acres of nurseries raised in the Agricultural College Farm at Bapatla. A special demonstrator is to supply these seedlings to interested growers in Guntur district covering about 60 acres at a nominal cost of Rs. 30/- per 6000 seedlings required to plant an acre. He will also supervise all the various operations during their growth. About 6000 lb. of seeds are estimated to be obtained free of cost for cultivation during the next season. The seeds are to be collected year after year by this method so that a supply of Virginia seeds for maintenance of purity is assured and hybrid growth avoided.

The tobacco crop: The seedlings are transplanted during September, October and November and the crop is harvested during December to February. Farmyard manure (3 tons) and ammonium sulphate (1 cwt) is applied per acre. The yield per acre is more in East and West Godavari districts being 600 to 800 lb. per acre, while the average yield in Guntur is 500—700 lb. The leaves of Rajahmundry area are bigger but the texture of Guntur leaves is better. This may be due to the soils being richer in the former area. At the same time it can be that Guntur soils have become tobacco "sick", having had tobacco grown continuously for 15 years. Experiments at the Rajahmundry Tobacco Research Station shows that the optimum and economic dose of manuring for Virginia is Nitrogen 20 lb. and Phosphorus 50 lb. per acre, in addition to farmyard manure at 5 to 10 tons per acre. Further, it was also found that watering once after 30 days of transplantation and a second irrigation after 50 days gave an increased yield of 825 lbs. Yields of upto 1230 lb. have been recorded at the Research Station. Other important experiments are on spacing and rotation of crops. Among the 20 to 25 varieties tried at the Research Station, the performance of "Chatham" seems to be most encouraging but its popularity with cigarette manufacturers and foreign buyers has yet to be studied.

The present cost of constructing a flue-curing barn is about Rs. 2500, with provision for using coal or firewood as fuel. A new type of aluminium, portable barn has been introduced by a private concern

in Vijiawada and the fuel used is crude oil. The cost of this barn is Rs. 4500/-. The cost of working is slightly more than in coal-burning barns but the main advantage is that the temperature inside the barn is easily controlled and the general management is easier.

Marketing: Flue-cured Virginia tobacco is marketed from January to April. The average annual production is of the order of 100 million lb. of cured leaf for the past 2 or 3 years. Manufacturers, exporters and merchants buy off the top grades (which form about 50% of the production) quickly within a month of the opening of the season. The low grades are purchased during the subsequent months, extending up to April.

It is estimated that 20% of the crop is sold in villages and the remaining 80% sold at what are called "purchase platforms". These platforms are about 43 in number, distributed all over Guntur, Krishna, East and West Godavari districts belonging to three well-established concerns and about eight big tobacco merchants. A farmer gets his cured produce in a non-standardized bale roughly graded as 1.V., 2.V., 3.V. and so on, to one of the platforms of a company. The bales are opened and examined by experienced purchasers of the company and the rate at which his company is prepared to pay for a particular bale is marked on the bale itself. It is optional for the grower to part with his produce at that rate or take it to another platform of another company or to his house or present the same the next day on the same platform. The average prices paid to farmers at the buying platforms during 1951 season by a particular concern were as follows:—

Producers' grade	Price per candy of 500 lbs.	
	Rs.	Rs.
1.V.	650	750
2.V.	400	645
3.V. (LBy & LBy ₂)	300	400
LG	500	600
LMG & DG.	75	250
Perished leaf	30	60

Auction floors: In January 1951, the Madras Government introduced the auction sale system as an experiment on the lines of U.S.A. and Rhodesian models, in the Guntur area. An area within 5 miles radius from Guntur town covering about 10,000 acres was notified. Under this system a grower within this area has the option to (1) take it outside this area and sell or (2) to enter into a private negotiation with a merchant and settle the price and bring it to auction floor for weighment, (This sale is mostly on credit basis) or (3) to take his produce to the auction floor where an auctioneer appointed by the Guntur District Tobacco

Committee conducts the auction bale by bale. The manufacturers, exporters and merchants bid and a competitive price is realised by the grower. Transactions on the auction floor are strictly on cash basis under special rules and by-laws of the committee, the buyers having to deposit money before coming to the auction.

The tobacco auction floor is the biggest of its kind in India and is a pucca building built at a cost of Rs. 1½ lakhs to keep 1000 bales at a time for conducting auction sales. The highest price in the annals of Guntur tobacco industry was Rs. 750/- per candy of 500 lbs. The prices obtained on the auction floor are usually higher than the rates obtaining outside on the same days.

The following are the transactions on the auction floor since its inception to end of March 1951.

Period	Tobacco sold by auction			By private treaty (within the notified 5-mile radius)		
	Qty. (000 lb.)	Value (Rs. 000)	Average price per lb.	Qty. (000 lb.)	Value (Rs. 000)	Average price per lb.
January 24-1-51 to 31-1-51	23.5	25.7	1-1-6	51	48	0-15-1
February	113.5	131.0	1-1-6	1194	1201	1-0-1
March	31.9	26.8	0-13-8	734	669	0-14-11
Total	174.9	183.5	1-0-2	1979	1918	0-15-4

There seems to be great scope to educate and train the farmers to grade according to Agmark standards or at least near to Agmark standards before bringing their produce to the auction floor. By so doing the growers would get correct value for their goods and the benefits of grading will reach the growers.

All purchases at "purchase platforms" are on cash basis and payment is paid the same or on the next day to growers. Usually the big concerns owning those platforms have either firm orders from the United Kingdom or the Continent or have their own cigarette factories in India. Only about 10 million lb. are said to be purchased by other merchants. 50% of this produce (5 million lb.) is purchased on credit basis and is sent to foreign countries on consignment basis but they get 60 — 80% of the value as advance on presentation of shipping documents. Even the big companies sometimes send on consignment basis if the tobacco

is a low grade type. However, on account of the great demand for tobacco in the continental countries, particularly Russia and Yugoslavia, the low grade stocks of 1944 and 1945 were purchased by Russia in the year 1946. The low grade stocks covering 1947, 1948 and 1949 crops were purchased by Russia and Yugoslavia, to the tune of 8.76 and 6 million b. respectively in 1950 and the value for the same was paid at Guntur itself. Hence there is no problem of stagnation or accumulation of low grade tobacco in the Guntur area.

There is also a system of sending brokers to village and buying tobacco from the ryots, but this is mostly on a credit basis.

The 'Katcha' bales purchased at the platform from ryots are taken to sorting sheds where they are opened. Women labourer sort the leaves into different grades. If the tobacco is going to their own cigarette factories in India the grading is according to their own private grades. Otherwise it is as per "Agmark" grades as F. C. V. 1, 2, 3, 4, LBy, LBy₂, Brown, DB, LG, IMG, DG, and PL. The cost of grading will be 0-1-3 to 0-1-6 per lb. The graded leaves are pressed into loose bales in hand-operated presses and sent by lorries, boats or bullock carts to redrying factories. Here the leaves are "stemmed" i. e. the midrib is removed by women labourers. Stemming charges work out to 0-1-3 to 0-1-6 per lb. The strips (stemmed leaves) are passed through the redrying plant, where it passes through drying chambers at about 160°F and then cooling chambers and then reaches the reordering compartment, where there is moist air at 130°F. The tobacco takes up the correct amount of moisture of about 10% and passes out of the plant properly conditioned. Redried tobacco has a better keeping quality. There are 16 redrying factories for the entire area with capacities varying from 750 lb. to 3,500 lb. per hour. The present cost of erection of a redrying plant will be as follows:—

	For 3,5000 lb. capacity	For 2,750 lb. capacity
	Rs.	Rs.
Cost of plant	2,70,000	1,50,000
Cost of building	5,30,000	3,50,000
Cost of land and acquisition	2,00,000	
Auxiliaries	1,50,000	1,00,000
	11,50,000	6,00,000

The redrying charges will be 0—1—0 to 0—1—3 per lb.

The tobacco is then packed in bales of 250 lb. net or in deal-wood cases of 350 lb. net. The present cost of packing comes to Rs. 6—0—0 and Rs. 20—0—0 respectively and these packages are now ready for export. It is now that bales are examined one by one and "Agmark" labels given.

The average number of labourers engaged per day during the season is of the order of 35,000 for the whole area for grading stemming, redrying and stocking operations. This does not include the number employed in the flue-curing barns which may be of the order of 75,000 persons per day on an average. It would not out of place to mention here that the arrangements made by Indian Leaf Tobacco Development Company, Chirala for labour are noteworthy. The facilities offered in the form of dispensaries, creches, rest places and canteens inside the factory premises can serve as a model for other factory labour managements.

The tobacco stems (midribs) derived from stemming operations are put to different uses, such as :—

- (1) As manure for seed nurseries.
- (2) Stems are flattened under rollers and blended in the manufacture of cheap cigarettes.
- (3) Exported to Hongkong, Amsterdam.

The tobacco seed oil is in demand in the United Kingdom for manufacture of paints. The price per imperial maund seed in 1949 was from Rs. 6/- to 9/- while the price of oil per maund ranged from Rs. 46/- to 47/- and about 1000 tons of oil was exported to United Kingdom the same year. The price of oil cake was Rs. 3—4—0 per maund and this was used as manure.

"Agmark" Grading: To have a control over the quality of tobacco exported, Government of India in 1945, made it compulsory to grade and mark tobacco under tobacco grading and marking rules for export of Indian tobacco to foreign countries. The inspectorate staff consisting of one Chief Inspector, one Senior Inspector, 2 Vigilance Inspectors and 16 Inspectors work under the control of the Agricultural Marketing Adviser. Each bale or package packed for export is examined, free of charge for the exporter, and Agmark labels are issued according to the grades assessed. In order to ensure a proper check the Chief Inspector and the Vigilance Inspectors carry out surprise checks at the packing centres, redrying factories and ports of shipment.

During 1949 there were 273 parties authorised to "Agmark" tobacco and the progress of grading was as under ¹ :—

Varieties of tobacco	In million lb. 1949	Value in crores of Rs.
Flue-cured virginia	64.5	7.21
Sun-cured virginia	2.1	0.10
White Burley	2.2	0.14
Sun-cured country tobacco	8.3	0.47
Jutty	2.8	0.06
Top leaf		
Stems	1.1	small
Total	81.0	7.98

The Agmark grading has increased the confidence of foreign buyers who now advance 80 — 100 percent of value on presentation of shipping documents and firm orders are also being received on Agmark basis. This in itself is no small measure of achievement. Continental manufacturers do not seek now the aid of London or Continental brokers. Even in the local market, trade is carried out on the Agmark system. Local banks and agencies give now more recognition for advancing money on the pledge of "Agmarked" bales.

In this connection it will be interesting to know that price difference between grades obtained after inception of tobacco grades is more uniform than in the earlier periods as shown in graph I in which prices realised in pence F. O. B. Madras by an average Indian shipper for redried strips for grades 1 to 4 are illustrated.

Exports: The following table gives an idea of the position of Madras State in the foreign trade of raw tobacco ² :

Exports in million lb.					Imports in million lb.				
1945	1946	1947	1948	1949	1945	1946	1947	1948	1949
'46	'47	'48	'49	'50	'46	'47	'48	'49	'50
Total raw tobacco to foreign countries					12.7	63.2	43.6	43.2	72.3
					Nil	small	3.0	2.4	2.2

The exports in the year 1949—50 reached the highest level of 72.3 million lb. as illustrated in Graph II. The following were the principal countries to which the exports were made, viz. United Kingdom 45.6 million lb. Netherlands 4.04, Belgium 3.2, China 1.6, Hongkong 4.0.

¹ From "Indian Tobacco" January 1951.

² From Sea Customs Statistical Department.

This includes a small quantity of country tobacco. Thus exports to the United Kingdom form nearly 63% of the total quantity exported. A study of the United Kingdom market during 1949-50 will reveal that she purchased from India during June-July season of 1949-50 only 14.4 of her total requirements of flue-cured tobacco.

Imports into the United Kingdom¹ (1949-50 June to July)

		Stripped	Unstripped	Total
<i>Flue-cured:</i>	Southern Rhodesia ...	12	35	47
	India ...	31	8	39
	Canada ...	—	14	14
	U. S. A. ...	3	156	159
	Others ...	—	5	5
	Total flue-cured ...	46	218	264
		Stripped	Unstripped	Total
<i>Other types:</i>	Nyasaland ...	5	9	14
	India ...	8	—	8
	Turkey ...	—	14	14
	U. S. A. ...	—	3	3
	Others ...	1	5	6
	Total ...	14	31	45
Total of all types ...		60	249	309

The above figures also reveal that the imports from India are mostly stripped, while other countries export only leaves (without stemming). The quality of our tobacco is said to be almost equal to that of Southern Rhodesia in texture, flavour and colour, but inferior to American tobacco. Our tobacco is said to blend very well with American tobaccos in the manufacture of cigarettes. In order to extend our export market, the quality of leaf as well as processing methods have therefore to be improved.

Madras State exports appreciable quantities of raw tobacco to other Indian States also both by rail and by sea. The exports include both Virginia as well as country tobacco, while imports of 'bidi' tobacco from Bombay and Mysore are also noted.

¹ From "Tobacco Intelligence" of Commonwealth Economic Committee, August 1950.

The tobacco consigned to other States in India are mostly for cigarette manufacture. The tobacco is said to be kept in storage for two years, for "maturing" before being used by cigarette manufacturers. There are about 22 cigarette factories in India. Almost all the brands of cigarettes in the market to-day are manufactured in India itself. Some cigarettes are even exported to important countries like Australia, Ceylon and Malaya. During 1949, 21,822 million cigarettes were produced in India¹. The most popular of the brands manufactured in India are, "Craven A", "Players", "Gold Flake", "Scissors", "Passing Show", "Number Ten", "Carlton's type" etc. It is said that in high-grade cigarettes 70-80% of American tobacco, is used for blending. medium grade cigarettes contain 30% American tobacco, 10% sun-cured Virginia and the rest flue-cured Virginia, while 10-70% country tobacco or sun-cured Virginia and the rest flue-cured Virginia are used for low grade cigarettes. Burley type is used for pipe mixtures.

The paper used for cigarettes is imported from America, United Kingdom, France, Japan, etc. A cigarette paper manufacturing factory was opened at Calcutta on 6-3-1951 by Shri Hari Krishna Mehtab, Minister for Commerce and Industry. First of its kind in India, the mill is designed to produce 240 tons of cigarette paper per month. 100 tons would be used for India's consumption and the rest would be exported, to enable India to earn foreign exchange for a crore of rupees. The cost of erection of the mill was Rs. 2.27 crores. Mr. Mehtab said "Although the consumption of cigarettes might be condemned in public speeches from the moral point of view, in reality the number of smokers was increasing. The country therefore needs manufacture of more cigarettes." The trend of demand for high grade and costly cigarettes is downward.

I thank Sri S. N. Venkataraman, State Marketing Officer, Madras, and Sri P. L. Tandon, Chief Inspector, Tobacco grading, Guntur for some of the data included in this article.

¹ Indian Trade Bulletin, 1st September 1950.

The Guava (*Psidium guajava*)

By

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Introduction: The guava is a sub-tropical, hardy, ever-green fruit-tree grown all over Uttar Pradesh, and Madras. It is grown in parts of Sindh, and also in places like Dharwar in Bombay. It can withstand a maximum temperature of 114° F., even with scanty rainfall of less than 10". In Madras it grows to perfection in the alluvial areas of the Godavari, Krishna and Sarada, where there is an adequate admixture of sand in the soil. In Bombay it has been reported to thrive quite well even on rocky soils. It is known to thrive even upto an altitude of 3,000 feet in the hill zones of South India. It is clear that it is a plant that is adaptable to a variety of conditions.

By careful cultural practices and irrigation, the guava can be made to yield almost throughout the year. The cheapness of the fruit, with the superior quality of the seedless types, make them the ideal dessert fruit of the common man.

The guava is particularly rich in vitamin C., with 280-580 mg. per 100 grams in different varieties. The white-fleshed varieties have generally more vitamin than the red-fleshed ones. The guava is also found to contain adequate pectin, which makes it suitable for preparation of jellies.

Due to its hardiness and ability to withstand climatic vicissitudes, its cheapness, and its usefulness as dessert and preserved fruit, it can have an important place in our fruit industry, but the fruit is not as popular as it can be, mainly because the superior, seedless varieties are not in extensive cultivation and also due to a lack of appreciation of the various guava products.

In spite of the ease with which it is grown the crop has not received so far much attention from research workers. The Bulletin of the Bombay Department of Agriculture by Cheema and Deshmukh (1927) forms the major reference work. A survey of guava cultivation in the Circars was done by Ibrahim (1948) wherein the practices and varieties were described at length.

Materials and Methods: The existing guava collection at the Fruit Research Station, Kodur, formed the bulk of the material. The methods adopted for determination of the viability of the pollen and

receptivity of the stigma had necessarily to be limited to field observations. These studies could not be followed up in the laboratory by examining sections at different stages to see whether fertilization took place or not. The existing branches and shoots in the Guava 49 were observed to note the nature of growth and flowering.

Presentation of Data and Discussion: The guava is a native of tropical America and belongs to the family *Myrtaceae* and the genus *Psidium*. The leaves are opposite, exstipulate and entire. The flowers are in cymes or in singles on current season's growth only. The receptacle is hollow and is united to the ovary and the flower is in consequence epigynous. The first layer of perianth leaves enclose the flower bud and are generally seen to crack slightly a day in advance of opening of flowers and expose the petals slightly. The calyx is not separable into any definite number of sepals. On the full emergence of the flower the calyx is thrown off bodily as a cap or torn into 2—4 unequal lobes which may subsequently drop away. The corolla consists of white, circular or oval, unequal sized petals varying in number from 5—12, though most have 7 or 8 only. The androecium consists of several thin filaments with bilobed anthers at the top. In some cases the filaments bear miniature petal-like structures, instead of anthers. The stamens are of different sizes and are arranged in the receptacle over the ovary. The gynoecium consists of an inferior ovary and is syncarpous with axile placentation. The style is longer than the filaments and is bent over the stamens in the bud stage. In rare cases the stigma has been noted to be bilobed.

Opening of Flowers: It takes 30 days from the visible differentiation of the flower bud to the opening of the flower. The flower buds that open the next morning show a cracking of the calyx on the previous day, nearly 24 hours in advance. The buds increase in size by the evening and the sepals get separated by 3 A. M. and the flowers open completely between 5 and 5-30 A. M. The petals drop off by noon. In the case of the seedless types the opening of flowers is similar except that the flowers open between 8-9 A. M. and in many cases the petals do not unfold themselves but are bodily thrown off as a cap. In a few cases it was noticed that the petal cap remains so for a day even after the opening of the flower.

Anthesis: The anthers commence dehiscing 15 minutes prior to the opening of petals and reach the peak dehiscence in about 45 minutes after the opening of flowers. By 7 A. M. 80% of the anthers shed their pollen, though a few may continue till about 9-0 A. M. The anthers thereafter gradually fade away and turn brown by the evening. Many of the filaments drop away by the evening or the next day, though a few might remain till the fruit matures.

Viability of Pollen: Pollen collected and kept at room temperature, when used the next day on freshly opened flowers did not result in fruiting in any of the varieties tried, namely, Red-fleshed Guava No. 46, Smooth Green and Nagpur Seedless. (The pollen is used on the same tree.) It may be presumed that the pollen loses its viability under field conditions by the next day.

Receptivity of the Stigma: Flowers pollinated one day before the opening flowers did not result in fruit-set in any of the varieties. Flowers that were artificially pollinated immediately after the opening of the flower i. e., 6—6-30 A. M. did not set appreciably in Smooth Green, Red-Fleshed and Smooth White. Flowers pollinated on the next day immediately after the opening of flowers did not result in fruit set, except in a few, rare cases in Smooth White. In very stray cases flowers pollinated on the third day have also set fruit. Flowers that were pollinated at about 8 A. M. in red-fleshed set fruits to the extent of 50%.

It is believed that the receptivity of the stigma commences only after the anthesis is nearly over, by about 8 A. M. and may in rare cases go upto the third day, if not pollinated and bagged. Under natural conditions the receptivity may not extend beyond the opening day of the flower. The stigma of the guava does not show any secretion denoting its receptivity unlike as in some other fruit plants. The stigma before the opening of the flower looks very green and on opening turns pale. By the evening on the day of the opening by 4 P. M. it turns slightly brown in withering up. The stigma is quite prominent in the case of the Nagpur Seedless and the Sharanpur Seedless and is darker than in seeded varieties. The stigma remains fresh for four or five days even after pollination, when kept bagged, in nature though it withers by the next day. The freshness of the stigma does not seem to give any clue as to its receptivity, as apparently such non-withered stigmas when pollinated after three days of the opening of the flower did not yield any fruit set. The style and the stigma are generally not persistent.

In nature cross-pollination is the rule as none of the flowers selfed and bagged set any fruit in Guava 49, Smooth Green and Nagpur Seedless.

The flowers are slightly protandrous and attempts were made to trace the agents of pollination. The following insects have been observed on the flowers at the time of anthesis.

1. *Apis dorsata*.
2. *Apis indica*.
3. *Andrena sp.*

Pollination by wind may also be possible as the pollen is very light and is produced in abundance in flowers of almost all varieties.

Results of Fertilization: After pollination the visible symptoms of fruit-set are manifest only after about 12 days. The ovary begins to swell slightly. If the flower is not fertilised it drops off between the 8th and 12th day of flower-opening, though in some cases it drops off earlier, by the 5th or 6th day. It is believed that fertilization takes place in about 7 to 10 days after the pollination, though it could not be confirmed by microscopic examination.

Percentage of Fruit Set in Nature: This was determined by selecting at random a few flowers and noting the number that had set. In Guava 49 only 12 out of 16 flowers had set. In Red-Fleshed 15 out of 22 had set i. e. 75% in the former and 66% in the latter, in this season.

Flower Shedding: Most of the flower shedding takes place between 5—12 days after opening of the flowers. In Nagpur Seedless and Sharanpur Seedless there is greater shedding of flowers and poorer set of fruits than in seeded varieties like Red-Fleshed and Smooth Green. Fruit shedding takes place only to a very limited extent, within a month from the opening of the flowers. The causes are believed to be physiological.

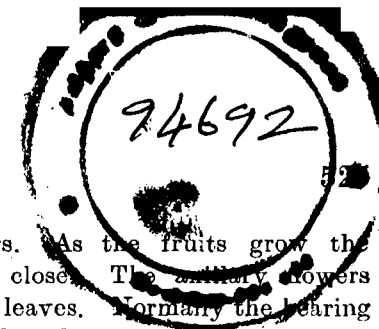
Parthenocarpy: Flowers emasculated and bagged in the following varieties did not result in fruit set, showing that parthenocarpy is not a common feature in the guava, even in the commercially seedless varieties.

Guava Red-Fleshed, Guava 46. Guava 49.

Nagpur Seedless, Sharanpur Seedless and Smooth White.

Seedlessness in Guava: The commercial seedless guavas are not entirely free from seeds, but do contain 9-20 seeds per fruit. These varieties differ markedly from the other seeded varieties in their leaf structure, opening time of flowers and method of opening and even in the production of pollen. The leaves of the seedless types are more roundish, while those of the seeded are elliptic. The Seedless produces pollen in abundance as the incomplete opening of the flower petals inhibits to some extent insect activity and also of wind which are the main agents of pollination. As already pointed out, the flower petals do not unfold completely in the case of seedless varieties while in the seeded ones they unfold completely. The seedless flowers shed their pollen between 8—9 A. M. while the seeded ones complete the anthesis by 7 A. M.

In guava the bearing is confined to the current season's growth only. The inflorescence is axillary and is in singles or in cymes of 2 or 3 flowers as in jasmine. A bearing twig yields one pair or two pairs and



very rarely two groups of three flowers. As the fruits grow the further growth of the twig comes to a close. The axillary flowers develop in the second and third pair of leaves. Normally the bearing twigs grow a few inches long, putting forth only four or five pairs of leaves. If meanwhile the flowers happen to set, the terminal bud does not grow any more but rests till the next growing season. After the fruits develop and mature, this twig generally dries up from the terminal bud backwards. In very rare cases when the tree and the branch are vigorous, further extension takes place in the next season but these growths do not bear flower or fruit directly.

The guava also puts forth another category of shoots every growing season, the vegetative shoots, as opposed to the flowering shoots described above. These shoots continue to grow, putting forth five to ten pairs of leaves in the growth period and rest for a while till the next growth period when it resumes growth again. The main difference between the two types of wood is that the fruiting wood generally dries up after the fruits are harvested while the vegetative wood merely rests for a while and continues to grow again. After a lapse of two or three seasons the axillary buds on the vegetative wood get activated and turn to be either fruiting wood or vegetative wood again. As the lateral buds get activated one by one the terminal growth comes to a close. In nature not all the buds get activated in one season and it takes several years to exhaust all the buds on such type of wood. The number that get activated depends on the vigour and age of the tree. Due to this peculiar phenomenon it is often found that the bearing region goes higher up with the age of the plantation though a few shoots that are activated on wood that is more than two or three years old remain at the lower reaches. This accounts for the patchy and irregular growth of the guava trees if left to themselves without sufficient care or attention.

To remedy the irregular activation and to keep down the bearing regions at a proper height to facilitate harvest, to increase the current season growths which are the ultimate bearers of the crop and to provide adequately for springing up of the vegetative wood, a proper system of pruning is essential.

The pruning removes the wood that bore the crop after the harvest as no longer useful to the plant, and cuts down to half the length, the vegetative type of shoots. This helps to activate the lower buds much earlier than in the normal course. It also helps in getting rid of unwanted wood, namely the shoots that bore the previous crop. It is essential to keep the tree in full vigour by adequately manuring and irrigating, as otherwise the response to pruning may not be impressive.

The Bombay method of pruning does not distinguish between the two types of wood but advises merely the pruning of fruiting wood to one or two buds unlike the system of pruning suggested above. By pruning closely to one or more buds the chances of getting more fruiting shoots are reduced, besides the risk of drying up of the entire twig. This might have been the reason why the pruned trees in their experiment have yielded only half that of unpruned trees. The quality of the fruits would have naturally improved as the total yield per unit plant decreased.

Pruning has to be done immediately after the harvest of the crop, that is once in January – February and again in August – September, if two crops are taken.

Conclusions: 1. Guava is a cross-pollinated crop.

2. Parthenocarpy is not a common feature in guava, at least in the varieties, Guava Red-fleshed, Guava 46, Guava 49. Nagpur Seedless, Sharanpur Seedless and Sooth White.

3. The crop is slightly protandrous.

4. The commercially seedless varieties differ in leaf shape, opening time of flowers, method of opening and anthesis, from the seeded varieties.

5. The guava throws out two distinct types of wood during the growth phase, a recognition of which is essential for understanding the bearing habits of guava.

6. Pruning of the vegetative wood to half the length and the removal of the fruiting wood after the harvest of the crop will lead to a proper manageable structure of the plant in addition to increased crop of better quality.

Summary: 1. The importance of the crop and its potentialities have been indicated.

2. The blossom biology of the crop has been presented and discussed.

3. The bearing habits have been analysed and a suitable method of pruning suggested.

Acknowledgments

My thanks are due to Sri C. Bhujanga Rao, B. Sc. (Ag.), Superintendent, for affording all facilities for the above work. My thanks are also due to the Government Entomologist for having identified the insect agents of pollination.

BIBLIOGRAPHY

1. Cheema, G. S. and Deshmukh, (1927) ... Culture of the Guava and its improvements by selection in Western India. Bull. 148 of 1927 of Bombay Department of Agriculture.
2. Hayes, W. B., ... Fruit Growing in India.
3. Ibrahim, Syed, (1946) ... A survey of Guava cultivation in the Circars.
4. Lowson and Sahni, ... Text book of Botany for India, Pakistan and Ceylon, revised by Howart and Warne, London University Tutorial Press, Limited.
5. Naik, K. C. (1949) ... South Indian Fruits and their Culture, Varadachary & Co., Madras.

A Note on the Five Year Plan

Present Position: A number of Agricultural Schemes have been in operation from 1949 – '50 under the Three-Year Plan of intensive cultivation schemes listed below. The planning Commission's Five-Year Plan is a continuance of the Three-Year Plan already initiated.

Provisions in the Plan: The Planning Commission after studying the Development Schemes of the Central and State Governments suggested the formulation of the Five-year Plan. The States drew up a plan of development suited to their local conditions and fixed targets for each of the Schemes included under it. The available resources—financial, technical and administrative—have been concentrated in a limited number of schemes and targets, easy of attainment, have been fixed. Among agricultural schemes, schemes which go to increase the production of food grains in a relatively short period and subsidiary schemes which supply the necessary equipment as a complement to the main schemes, have been formulated.

The main agricultural schemes included under the Plan are (a) distribution of improved seeds of paddy and millets and green manure (b) distribution of fertilisers (c) preparation of rural compost (d) land reclamation by tractor cultivation (e) distribution of oil engine and electric motor pumpsets and accessories for lift irrigation (f) installation of river pumping units and (g) Plant Protection. The targets and the estimated cost of the schemes are indicated below:—

Name of Scheme	Total Cost	Estimated additional Production
	Rs.	(Tons)
Distribution of Improved Paddy Seed ...	2,27,86,594	2,33,992
Distribution Millet Seeds ...	43,61,701	1,01,104
„ Pulses Seed ...	2,88,901	2,760

	Rs.	(Tons)
Green Manure Seed ...	84,26,901	1,62,237
Rural Compost ...	5,73,390	14,334
Plant Protection ...	78,75,000	...
Mechanical Cultivation ...	1,50,00,000	1,58,937
Intensive Cultivation in selected blocks ...	30,00,000	50,000
Contour Bunding ...	17,50,000	3,885
Procurement and sale of Pipes ...	19,00,000	47,800
Hiring of departmental pumping sets ...	38,00,000	5,200
Selling of Pumping Sets on instalment basis ...	2,40,00,000	79,625
River Pumping Schemes ...	1,17,00,000	90,155
Distribution of Ammonium sulphate ...	22,80,40,000	12,49,526
Subsidised sale of Phosphates ...	4,02,56,000	1,25,849

Great stress has been laid on Food Production by improved methods of agriculture and extension of irrigation. Many of the schemes coming under the plan are fully or partially self-supporting and are a continuance of the existing schemes under Intensive Food Production. The State of Madras, is the most deficit of all States and that deficit is in rice. Seasonal conditions remaining normal, the targets are easy of achievement.

Importance of Public Co-operation: The successful operation of the plan depends on the financial resources provided by the State and Central Government. Further augmentation of our revenues can be expected from the land. Though food prices are controlled, ryots raising food crops have not been able to earn their full share of increased prices. But ryots growing commercial crops have earned enhanced returns. They will have to contribute more to the State finances. The several irrigation projects have increased the value of irrigated land and it is but appropriate that a portion of this enhanced value goes to the coffers of the State to facilitate the developmental schemes being operated successfully.

Critical appreciation of the Planning Commissions, Proposals: The recommendations of the Planning Commission are under close examination and it is hoped that the several developmental schemes of the State will get a higher priority in the supplemental plan of the Commission.

All these plans would not give the anticipated increases in production, unless co-operation comes in an abundant measure from the cultivators of the land. In fact this is more important than the plan itself.

(Director of Agriculture, Madras)

Agricultural News Letter

Growing of "Sesbania speciosa" on field bunds for green manure: "Sesbania speciosa" a rapid growing green manure plant is grown conveniently on the sides of paddy field bunds for production of green leaf for manuring paddy.

From the experience gained in some of the districts the following procedure is recommended.

- The nursery for 'Sesbania speciosa' is sown at a seed rate of $\frac{1}{2}$ lb. per cent.
- The nursery bed should be well manured.
- To provide seedlings for planting at the time of transplantation of short duration paddy the green manure nursery should be sown 2 to 3 weeks in advance of the paddy nursery sowing.
- To provide seedlings for planting at the time to transplantation of long duration paddy the green manure nursery should be sown at the time of paddy nursery sowings.

Inter cropping of yam crop with millets: In Bhavani tract of Coimbatore district planting of elephant yam with cumbu and ragi as a mixture is in vogue. This practice yields two crops of millets, cumbu and ragi and one vegetable crop. Yam is planted in ridges and cumbu seedlings are transplanted in late May, along the sides of the ridges. Cumbu, is harvested in August. Later ragi is transplanted along the sides of the ridges as a second crop. Thus two food grain crops are raised within the period of growth of the yam crop. This method is in vogue in certain areas in Palladam taluk with adequate water supply.

Application of phosphatic manures to Sugarcane: The result of experiments concluded after three years at the Sugarcane Research Station, Gudiyatham on the effect of phosphates in combination with Nitrogen to sugarcane are useful to the ryots of the North Arcot tract. Nitrogen at two levels of 200 lb. and 250 lb. per acre was applied, $\frac{2}{3}$ as groundnut cake and $\frac{1}{3}$ as ammonium sulphate over a basal dressing of ten tons of farmyard manure per acre to Co. 419 sugarcane. Phosphates at 0 lb. 50 lb. and 100 lb. per acre were applied in combination with the two doses of Nitrogen.

Addition of phosphoric acid did not improve the yield or the quality of the juice.

The higher dose of nitrogen 250 lb. per acre recorded a significantly higher tonnage of cane than 200 lb. Nitrogen treatment. Plots receiving 200 lb. Nitrogen gave on the other hand, jaggery of better quality. Therefore application of 200 lb. Nitrogen per acre for the North Arcot area is recommended.

A New Selection of Talaivirichan Cholam: Two strains of Talaivirichan cholam Co. 2 and Co. 3 have already been released for distribution from the Millet Breeding Station, Coimbatore. Co. 2 has chalky grain and Co. 3 has pearly grain. They are spreading in the districts of Coimbatore, Tiruchirappalli, Salem, South Arcot, North Arcot and Chittoor.

A new selection A. S. 8008 which is an improvement on the existing strains has recently been isolated. It is selected from a vigorous natural cross in the strain Co. 2 and has reddish purple straw, short central panicle and pearly white grain. In yield studies conducted at the Millet Breeding Station, it was found promising, and trials were conducted at the Regional Millet Stations Narasapattanam, Tiruppattur and Ariyalur in 1950 and this selection gave higher yield than the local types at all the three centres. The same selection was also tried in a few taluks in the districts of Tiruchirappalli and South Arcot. From the results received so far it is found to be superior to the local types. In the trials conducted in 1950-'51 at two centres in the Ariyalur taluk, A. S. 8008 has given 36 and 148% more yield than the local type, while at Kullakuruchi in South Arcot district the increase in yield recorded by it over the local are 56 and 71%. The results are very encouraging and further trials are programmed to confirm the results already obtained.

Director of Agriculture, Madras.

Crop and Trade Reports

Statistics—Agriculture—Crop Forecast—Paddy—1951—'52—Madras State: The area sown with paddy in the Madras State up to 30th September 1951 is estimated at 6,049,000 acres. Compared with the corresponding estimate of 6,065,000 acres in the previous year, this is a decrease of 0.3 per cent. The area estimated is the same as that for the last year in the districts of Anantapur and Ramanathapuram. A decrease in area is estimated in the districts of Guntur, Cuddapah, Nellore, Chingleput, South Arcot, Chittoor, North Arcot, Tiruchirappalli, Madurai, Malabar and South Kanara and an increase in the other districts of the State. The decrease in area is due mainly to low supply of water in irrigation sources and insufficient rainfall at the sowing time.

The first crop of paddy has been or is being harvested in the districts of Cuddapah, Chingleput, South Arcot, Chittoor, North Arcot, Salem, Tiruchirappalli, Tanjore, Madurai, Tirunelveli, Malabar and South Kanara. The yield is expected to be below normal in the districts of East Godavari, Anantapur, Cuddapah, Nellore, Chingleput, South Arcot, Chittoor, North Arcot, Salem, Coimbatore and in parts of Tanjore, Malabar and South Kanara districts. In West Godavari district, the crop suffered considerable damage on account of heavy rains and floods during the last week of July, 1951. The condition of the standing crop is reported to be fair except in the districts of Srikakulam, Visakhapatnam, West Godavari, Krishna and Tiruchirappalli. The average wholesale price of paddy second sort per imperial maund of 82 2/7 lb. (equivalent to 3,200 tolas) as reported from important market centres on 6th October 1951 was Rs. 7-5-0 in Vijayawada, Rs. 7-11-0 in Tiruchirappalli, Rs. 7-13-0 in Eluru, Rs. 7-14-0 in Guntur and Kumbakonam, Rs. 7-15-0 in Masulipatnam and Nellore, Rs. 8-2-0 in Cuddalore, Rs. 9-10-0 in Vijayanagaram and Rs. 10-3-0 in Kakinada.

Statistics—Agriculture—Sugarcane Crop, Madras State—1951—'52—First Report: The area under sugarcane in the Madras State upto 25th May, 1951 is estimated as 123,650 acres. Compared with the area of 106,220 acres estimated for the corresponding period of last year, this is an increase of 17,430 acres or 16.4 per cent. The estimated area is the same as that of last year in Guntur, Cuddapah and Malabar districts. An increase in area is estimated in the districts of Srikakulam and Visakhapatnam (combined) West Godavari, Krishna, Kurnool, Bellary, South Arcot, Chittoor, North Arcot, Coimbatore, Tiruchirappalli, Tanjore, Ramanathapuram and Tirunelveli and a decrease in the other districts of the State. There is little or no cultivation of Sugarcane in the districts of Nellore and the Nilgiris. The condition of the standing crop is reported to be generally satisfactory, in the districts of Srikakulam, Visakhapatnam, West Godavari, Guntur, Bellary, Anantapur, South Arcot, Salem and South Kanara. In the East Godavari, Krishna, Kurnool, Cuddapah, Chittoor, North Arcot, Tiruchirappalli, Tanjore, Madurai, Ramanathapuram and Tirunelveli districts, the plantings have been just completed or are being completed. In Coimbatore district the crop is reported to have been affected to some extent by inadequate water supply. The planted crop in parts of North Arcot district is reported to have been attacked by shoot borer.

The wholesale price of jaggery per imperial maund of 82 2/7 lbs. in important markets on the 9th June, 1951 was Rs. 20-12-0 in Mangalore, Rs. 19-0-0 in Adoni, Cuddalore and Coimbatore, Rs. 18-12-0 in Rajahmundry and Kakinada, Rs. 18-1-0 in Visakhapatnam and Vizianagaram, Rs. 18-0-0 in Bellary, Vellore and Salem and Rs. 17-0-0 in Chittoor.

Statistics—Agriculture—Cotton Crop—Madras State 1951—'52—First Forecast report: The area under cotton in the Madras State upto the 25th July, 1951, is estimated at 77,300 acres. Compared with the area 60,000 acres estimated for the corresponding period of previous year, this is an increase of 17.1 per cent attributed generally to better seasonal conditions at the time of sowing.

2. *Central Districts and South: Mainly Cambodia.* The area in these districts is estimated to have increased from 44,200 acres to 53,400 acres, the increase in acreage being revealed in all the main cotton-growing districts of this tract except Salem, where a decrease in acreage is anticipated.

3. *Western Tract:* The area under Westerns including Mungari is estimated to have increased from 12,100 acres to 12,600 acres. The increase occurs in all the districts of this tract except Pattikonda taluk of Kurnool district.

4. *White and Red Northern tracts:* The area under White and Red Northern is estimated to have increased from 2,700 acres to 3,700 acres.

5. *Warangal and Cocanadas:* The area under Warangal and Cocanadas is estimated to have increased from 4,400 acres to 4,900 acres. The area estimated is the same as that of the previous year in all the districts of this tract except Guntur where there is an increase in acreage. In West Godavari and Nellore districts, the area under the crop is 'nil' in both the years.

6. The average wholesale price of cotton lint per imperial maund of 82 2/7 lbs. or 3,200 tolas as reported from important markets on the 4th August, 1951 was Rs. 82-5-0 for Cocanadas, Rs. 93-10-0 for White Northern, Rs. 94-13-0 for Red Northern, Rs. 82-13-0 for Western-Mungari and Rs. 87-1-0 for Westerns-Hingari at Bellary, Rs. 105-13-0 for Coimbatore Cambodia, Rs. 95-8-0 for Coimbatore Karunganni, Rs. 86-1-0 for Tinnevelly and Rs. 63-0-0 for Nadam cotton.

7. Figures by districts are given in the statement appended.

Cotton Raw, in the Madras Presidency: The receipts of loose cotton at presses and spinning mills in the Madras State from 1st February 1951 to 19-10-1951 amounted to 2,40,649 bales of 392 lb. lint. The receipts in the corresponding period of the previous year were 2,87,442 bales. 3,53,783 bales mainly of pressed cotton were received at Spinning Mills and 10,353 bales were exported by sea while 1,02,815 bales were imported by sea mainly from Karachi and Bombay. Government of Madras, Public (Economics and Statistics) Department.

Gleanings

Air-Griculture, Ltd., an Australian aerial sowing concern, has recently distributed 132 tons of superphosphate over 3,000 acres, planted 7,000 lb. of subterranean clover on 1,855 acres and sown 6,080 lb. of rye-grass on 800 acres on a holding in New South Wales. The operation was completed in 10 days.

The use of D. D. T. at a concentration of 200 parts per million on lucerne has been shown to cause the death of young turkeys fed on the lucerne hay. This is stated in the biennial report of Utah Experimental Station for 1948-'50. No poisonous effect was noted in the case of chickens, pigs and lambs, but poultrymen are warned that turkeys should not be allowed to graze ranges where D. D. T. has been applied for insect control.

Experiments have been carried out in Southern Rhodesia on the destruction of soil pests—including eelworm—by the use of high-frequency electric currents. It is thought that because the wave frequency is selective, the killing of beneficial organisms may be avoided. [*The Farmers Weekly* (London), July 27, 1951.]

Weather Review for October, 1951.

Weather Review — For October 1951

RAINFALL DATA

Division	Station	Total rain- fall for the month	Departure from normal in inches	Total since 1st January in inches	Division	Station	Total rain- fall for the month	Departure from normal in inches	Total since 1st January in inches
Orissa & Circars	Gopalpur	12.3	+3.7	47.4	Central Contd.	Coimbatore	3.1	-3.2	17.1
	Calinga- patnam	2.3	-5.6	34.8		Tiruchirapalli	4.7	-1.6	24.8
	Visakha- patnam	5.0	-2.8	39.3	South	Naga- pattinam	3.6	-7.0	20.8
	Araku Valley*	5.1	-3.6@	63.0		Aduturai*	3.2	-3.2	20.7
	Anakapalle*	5.5	-3.2	44.0		Pattukottai*	1.5	-5.4	16.7
	Samalkot*	3.8	-5.0	34.9		Madhurai	5.2	-2.2	32.9
	Kakinada	5.1	-3.4	40.4		Pamban	1.9	-6.6	18.3
	Maruteru*	5.0	-3.0	50.6		Koilpatti*	1.6	-4.9	17.2
	Masulipatnam	1.4	-7.2	33.5		Palayam- cottai	1.5	-5.6	15.7
	Guntur*	5.0	+0.7	28.2		Amba- samudram*	2.2	-4.4	25.2
	Agri. College, Bapatla*	1.9	-4.8	26.3		Trivandrum	9.3	-1.4	57.9
	College Farm*	1.4	X	28.3		Fort Cochin	8.8	-4.6	91.0
	Rentachintala	1.1	-3.9	17.7		Kozhikode	5.6	-5.5	94.7
Ceded Districts	Kurnool	2.2	-1.0	27.2	West Coast	Pattambi*	6.6	-2.6	78.0
	Nandyal*	0.5	-2.3	23.1		Taliparamba*	7.6	+0.5	111.4
	Hagari*	2.5	-0.7	20.9		Nileshwar*	10.1	+5.4	112.2
	Siruguppa*	2.9	-1.4	18.7		Pilicode*	9.4	+4.7@	110.3
	Bellary	2.4	-1.8	23.2		Mangalore	5.4	-1.9	116.4
	Cuddapah	2.7	-2.2	18.5		Kankanadi*	5.8	-0.6	113.5
	Kodur*	2.4	-5.0	17.7		Chitaldrug	6.6	+1.8	25.5
						Bangalore	5.0	-0.9	33.4
Carnatic	Nellore	2.0	-7.6	15.3	Mysore & Coorg.	Mysore	8.7	+2.8	30.5
	Buchireddi- palem*	0.9	-8.4	13.3		Mercara	6.4	-1.9	117.2
	Madras (Meenam- bakkam)	2.8	-9.2	20.1	Hills	Kodaikanal	5.5	-4.7	63.3
	Tirurkuppam*	2.3	-8.0@	21.0		Coonoor*	3.0	-6.5	48.1
	Palur*	2.6	-4.8	24.8		Ootacamund*	3.7	-4.2	41.6
	Tindivanam*	1.9	-4.5	19.1		Nanjanad*	8.2	+0.6	59.7
	Cuddalore	1.7	-9.8	18.2					
Central	Vellore	2.6	-4.2	24.8					
	Gudiyatham*	5.0	-0.7	18.4					
	Salem	2.3	+4.1	26.0					
	Coimbatore* (A. M. O.)	3.7	+2.6	13.1					

- Note:—
- * Meteorological Stations of the Madras Agricultural Department.
 - @ Average of nine year's data for Pilicode, eight year's data for Tirurkuppam and seven years' data for Arakuvalley is given as normal.
 - Average of ten years' data is taken as normal.
 - X The farm was started only this year.

The trough of low pressure which formed in the West Central Bay of Bengal and which extended into the Arabian Sea off the Kanara-Konkan Coast during the last two days of September, 1951 persisted and became more marked at both ends on 1-10-51, inducing widespread rainfall along the West Coast and Coastal Andhradesa. The trough of low pressure in the east Arabian Sea moved away northwards on 2-10-51. The trough of low pressure in the West Central Bay moved away North-East-wards inducing a low pressure area over Chota-Nagpur and North Orissa on 2-10-51 and became unimportant on 4-10-51 over West Assam and neighbourhood. A shallow trough of low pressure extended from North West United Province to the North Bay of Bengal on the 6th and 7th October, 1951 and became unimportant. A diffuse trough of low pressure which lay over the central and the adjoining North Bay of Bengal on 7-10-51, accentuated and concentrated into a depression on 11-10-51 near Lat. 14° N and Long. $87\frac{1}{2}^{\circ}$ E, passed inland across the Orissa coast on the very next day, weakened to a shallow 'low' while moving west-wards, and on 15-10-51 merged with the trough of low pressure that persisted off the Konkan-Kathiawar coast from 14-10-51. This induced widespread rains in the Northern Districts of coastal Andhradesa, and along the West Coast and local rains in Tamil Nad on 11-10-51. The trough of low pressure in the east Arabian Sea, off the Konkan coast, became less marked and unimportant on 16-10-51. In the meantime, a low pressure wave moved westwards across central and upper Burma towards South East Assam and became less marked on 17-10-51. A feeble anticyclonic circulation developed in the upper air over east Madhya Pradesh and the adjoining parts of Orissa and coastal Andhradesa on 18-10-51. This shifted towards West and persisted over the central parts of the country upto 22-10-51. A trough of 'low' appeared in the South East Arabian Sea on 12-10-51 and became less marked on the very next day. Simultaneously a cyclonic circulation existed over the North Andaman Sea upto 5000' a.s.l. on 22-10-51 strengthened into a trough of low on 24-10-51, making the conditions favourable for the onset of the North East Monsoon. This seasonal trough over the South Bay of Bengal persisted and the North East Monsoon set in along the east coast North of Madras on 27-10-51 and extended to the Coromandal Coast within two days.

Under its influence widespread rains occurred in the Coastal Andhradesa and the adjoining districts of Tamilnad on 27-10-51 and widespread rains in Tamilnad on 29-10-51. The shallow low pressure area became more marked on 31-10-51 off the Orissa Coast.

In general the rainfall of the month was very much below normal in Tamil Nad and Coastal Andhradesa and moderately below normal in other parts of the State.

Day temperatures were generally above normal in the region. Particulars regarding the zonal rainfall and the noteworthy falls during the month have been furnished hereunder:—

Noteworthy Falls During the Month.

S. Nor	Date	Place	Rainfall in inches for past 24 hours.
1	6-10-51	Mangalore	2.7
2	13-10-51	Mysore	2.9
3	23-10-51	Mathurai	2.4
4	24-10-51	Trivandrum	2.9
5	28-10-51	Alleppey	3.3
6	29-10-51	Chitaldrug	2.0
7	30-10-51	Gopalpur	3.0

ZONAL RAINFALL

Name of the Zone	Actual rainfall	Departure from normal	Total Precipitation
1. Orrissa and Circars	4.1	— 3.5	Far Below Normal
2. Ceded Districts	2.2	— 2.1	Far Below Normal
3. Carnatic	2.0	— 7.5	Far Below Normal
4. Central	3.6	— 2.7	Far Below Normal
5. South	2.6	— 4.9	Far Below Normal
6. West Coast	7.7	— 0.7	Below Normal
7. Mysore and Coorg	6.9	+ 0.4	Normal
8. Hills	5.1	— 3.7	Far Below Normal

Agricultural Meteorology Section,
Lawley Road Post, Coimbatore,
Dated 12th November, 1951.

M. B. V. N., C. B. M. & M. V. J.

ERRATA TO MADRAS AGRICULTURAL JOURNAL

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Page	Line	Read	For
476	24	20,000	2,000
476	33	25,830	26,830
477	6	traditionally	traditionally
477	Statement item 1 col. 2	Paraya	Parava
478	Statement item 1 col. 3	11,790	11,793
	" " 4	32.6	32.7
	" 2d " 3	9,160	9,060
479	Statement item c col. 4	1,500	1,550
	" d " 5 line 5	10	18
480	4	200	290
	42	more or less	more less
481	Statement item e col. 2	...	100—80
	" e col. 3	100—80	...
484	10	actual	equal
487	Appendix item 1 } col. 5 line 1 }	65	55
	item 1 line 3 col. 4	110	100

Departmental Notifications

GAZETTED SERVICE—POSTINGS AND TRANSFERS

Name of officers	From	To
Sri Balasubramaniam, R.	Cotton Extension officer, Coimbatore,	Principal, Agricultural College, Bapatla
" Hanumantha Rao, D.	D. A. O., Vijayavada,	J. L. A., Bapatla
" Kanti Raj, M.	Deputation to Canada,	Headquarters Dy. D. A. (propaganda), Madras
" Lakshmikantham, M.	Superintendent, A. R. S., Samalkot,	Asst. Agronomist, S. R. S. Anakapalle
" Muthuswami, S.	Sugarcane Inspector, Mathurai,	Addl. D. A. O., Tanjore
" Ponnaiah, J. S.	D. A. O.,	Sugarcane Inspector, Vuyyur
" Rajavadan, P.	Supervisor High Ways Department, Madras,	Asst. Agricultural Engineer, Madras
" Sethu Ramaiah, P.	Agronomist, Siruguppa,	Supdt. A. R. S., Samalkot
" Venkatasubramaniam, P. S.	Addl. D. A. O., Tanjore,	Special D. A. O., Tanjore

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" Dharmalingaswami, P.	Asst. Inspector of Fertilizers, Vellore,	A. D., (Sugarcane), Vellore
" Gopala Rao, B. V.	Special A. D., Sulurpet,	Fruit Asst., Kodur
" Hanumantha Rao, Ch.	Paddy Asst. R. R. S. Buchireddipalem	Paddy Asst., Tirukuppam
" Hanumantha Rao, M.	Special A. D. (Manures),	Special A. D., Hospet
" Jagannatha Rao, R.	On leave,	A. A. D., Bellary
" Krishnamurthi, R.	On leave,	F. M., Mewani
" Lakshminarayana, E.	A. A. D., Repalle,	P. P. A. (Entomology), Cuddapah
" Mohammed Majaduddin,	Special A. D., Gudivada,	A. D., Salur
" Narasimha Rao, G.	A. D., Nandigama,	P. P. A., Anakapalle
" Prbhakara Rao, C.	Special A. D., Sugarcane, Hospet,	F. M., Sugarcane Liaison Farm, Samalkot
" Perraju, A.	A. D., Madakasira,	P. P. A., Cuddapah
" Padmanabha Rao, K.	On leave,	Fruit Inspector, Kodur
" Ranga Rao, K.	P. A., to D. A. O.,	Teaching Asst. in Agri. Bapatla
" Sankaran, K. N.	Asst. in Oilseeds, Nileshwar	Coconut Nursery Asst., Pattambi

Names	From	To
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„ Srinivasalu, K.	Paddy Asst., Tirurkuppam,	Paddy Asst., R. R. S., Buchireddipalem,
„ Seshagiri Rao, M.	Marketing Asst. Kakinada,	A. D., Tenali
„ Sithapathi Rao, S.	A. D., Ramachandrapur,	Marketing Asst., Kakinada
„ Satyanarayanamurthi, K.	Paddy Asst., A. R. S., Maruteru,	F. M., A. R. S., Samalkot
„ Subba Raju, A.	F. M., A. R. S., Samalkot,	Paddy Asst., A. R. S., Maruterur
„ Solaiappan, B.	A. D., Sugarcane, Vellore,	Asst., Inspector of Ferti- lizers, Vellore
„ Venkata Reddy, J.	Cotton Asst., Adoni,	Cotton Asst., Nandyal
„ Vamsavardhanan, B. B.	Special A. D., Kothapeta,	A. D., Nandigama
„ Vittal Hegde, Y.,	On leave,	F. M., A. R. S., Nileshwar



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