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THE
Madras Agricultural Journal

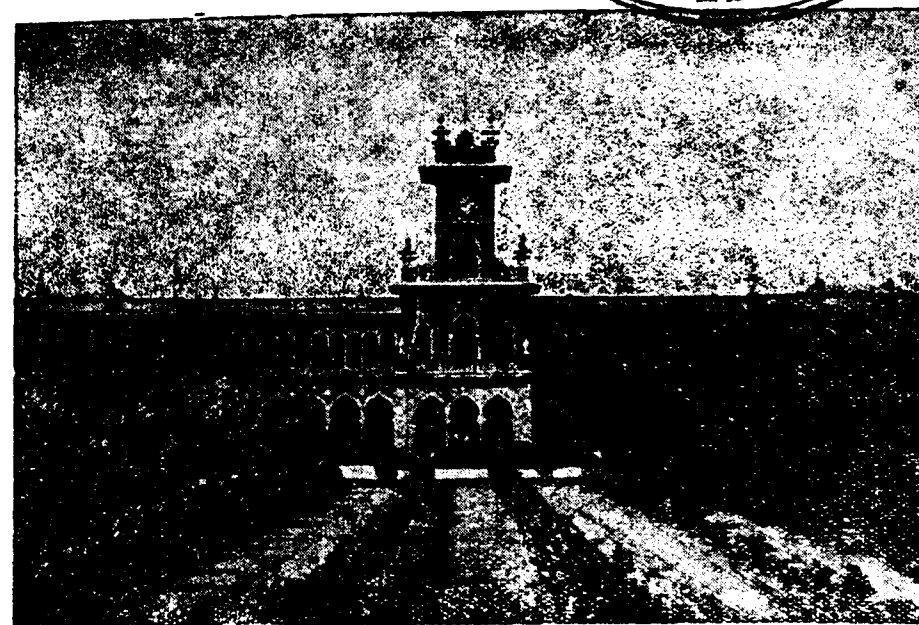
Vol. XLIV

October 1957

18 JAN 1958

No. 10

MADRAS



AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, COIMBATORE

Published by
THE MADRAS AGRICULTURAL UNION,
(M. A. S. U.)
AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE
COIMBATORE, S. INDIA.

Annual Subscription.

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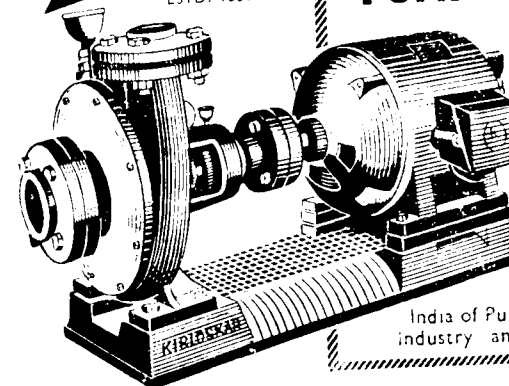
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INDIAN COUNCIL OF AGRICULTURAL RESEARCH THE RAFI AHMED KIDWAI MEMORIAL PRIZES FOR AGRICULTURAL RESEARCH.

The Indian Council of Agricultural Research has with a view to creating an incentive for research workers and to recognising outstanding research work done by them in the fields of agriculture, animal husbandry and allied subjects, decided to institute 11 prizes of the value of Rs. 5,000 each. These prizes will be known as The Rafi Ahmed Kidwai Memorial Prizes for Agricultural Research and one prize will be awarded annually for outstanding research work done in India in each of the following subjects:

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| 1. Agronomy | 7. Animal breeding |
| 2. Agricultural Engineering | 8. Animal Nutrition (including Physiology and biochemistry) |
| 3. Agricultural Chemistry | 9. Animal Diseases |
| 4. Agricultural Botany | 10. Dairying and |
| 5. Agricultural Zoology (including Fisheries) | 11. Agrl. and Animal Husbandry Economics and Statistics |
| 6. Horticulture | |

2. These prizes will be in the form of gold medals or cash or both and the first prize in each subject will be awarded for outstanding research work done in the country either individually or jointly during the calendar year 1957 i.e. 1st January to 31st December 1957 and thereafter for such research work carried out during each subsequent calendar year.

3. The award of each of the prizes shall be based on significant advances in human knowledge in a particular subject as revealed by books, monographs or papers published in the name of the candidate or any other unpublished account of the outstanding research work done or discoveries and inventions made by him. The selection of a candidate for the award of a prize will be made on the recommendations of a judging Committee consisting of eminent scientists appointed for the purpose by the Indian Council of Agricultural Research. The award of a prize may be made to more than one research worker and the prize money divided amongst them in such proportion and manner as may be decided by the Council.

4. All researcher workers, engaged in research work in India in the fields of agriculture, animal husbandry and allied sciences are eligible for competing for these prizes. Applications should be submitted in *quintuplicate* in the prescribed form which can be had free of cost from the Addl. Secretary, Indian Council of Agricultural Research, Queen Victoria Road, New Delhi. Candidates working in Research Institutes etc. should submit their applications through the Head of the Institute/Department etc. Others may submit their applications direct.

5. All applications should be sent in a sealed cover and addressed to the Addl. Secretary, Indian Council of Agricultural Research, Queen Victoria Road, New Delhi so as to reach him not later than the 30th April 1958. The cover of applications should be superscribed as under:

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The Madras Agricultural Journal

Vol. XLIV

OCTOBER 1957

No. 10

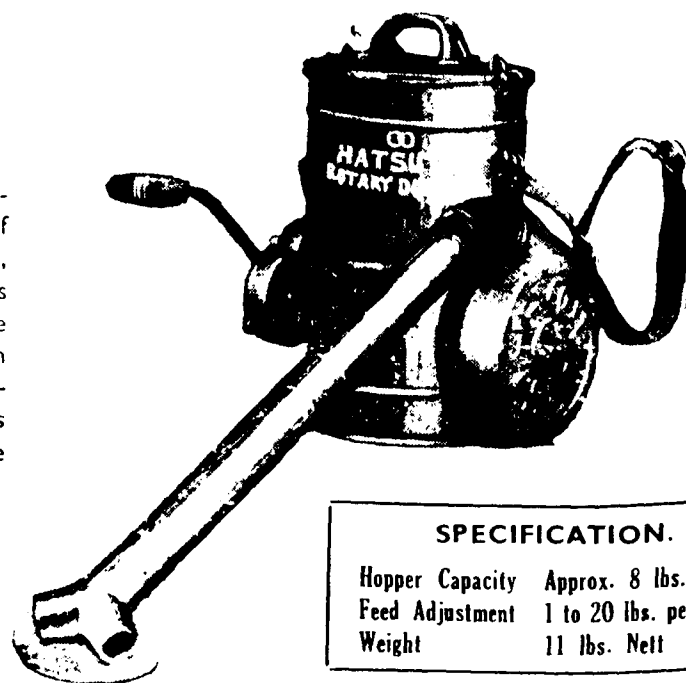
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Preliminary Studies on Raising *Sesbania Speciosa* for Green Manure in the Laterite Soils

by

K. S. NAIR,

S. VARADARAJAN, and T. RAJAGOPALA IVENGAR.

Chemistry Section,

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Introduction: The laterite soils of the West Coast are characterised by their low pH values, poor base status, and low availability of phosphoric acid, though they are well supplied with total phosphoric acid and nitrogen, as seen from the figures of analysis of a typical sample, given in table I. Besides, the soils are very porous lacking in humus and hence have a low moisture holding capacity. To raise their level of productivity it is necessary to build up their organic matter status, for which the best course open is by raising green manures. *Sesbania speciosa*, because of its performance everywhere was considered to be the best for this purpose. But preliminary studies, carried out in the laterite soils of Mangalore showed, that *Sesbania speciosa* did not produce good growth, and nodule formation was also poor even after inoculation of the seeds with the proper Rhizobia.

The reason for the failure of the treated seedlings was thought to be due to the acid nature of the soil. A similar instance has been noted by Fellers (1918) who reported poor nodulation of soya-beans in an acid soil, even though large numbers of the proper bacteria were known to be present. Fred. Baldwin and McCoy (1932) proved that legumes thrive well in reactions at or near neutral point.

Detailed studies were, therefore carried out at the Agricultural Research Station, Pattambi to ascertain the ideal conditions for best nodulation and increased yield of *sesbania speciosa* and the results of these studies are presented in this paper.

TABLE I

Composition of the Laterite soil of Pattambi (Malabar)

CONSTITUENTS		
pH	5.40	
Moisture	2.55	percent
Loss on ignition	6.40	"
Insolubles	60.62	"
Iron (Fe_2O_3) plus Alumina (Al_2O_3)	29.36	"
Lime CaO	0.11	"

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TABLE I (Contd.)

CONSTITUENTS		
Magnesia 'MgO'	0.20	..
Total Potash 'K ₂ O'	0.21	..
Soda Na ₂ O	0.42	..
Carbondioxide 'CO ₂ '	Nil	
Total phosphoric acid 'P ₂ O ₅ '	0.18	..
Sulphuric acid 'SO ₃ '	0.19	..
Nitrogen 'N'	0.14	..
Available Potash 'K ₂ O'	0.0024	..
Available phosphoric acid 'P ₂ O ₅ '	0.0062	..

Materials and Methods: The experiment was laid out during 1955 in randomised one cent plots with the following treatments, replicated four times.

- Control (no manure)
- Lime at 1500 lb. per acre
- Superphosphate to give 30 lb. P₂O₅ per acre
- Farmyard manure at 5000 lb. per acre
- Lime at 1500 lb. plus superphosphate at 30 lb. P₂O₅ per acre
- Lime at 1500 lb. plus farmyard manure at 5000 lb. per acre
- Superphosphate to give 30 lb. P₂O₅ plus farmyard manure at 5000 lb. per acre
- Lime at 1500 lb. plus superphosphate to give 30 lb. P₂O₅ plus farmyard manure at 5000 lb. per acre

The manures were applied in the puddled condition. The seeds were treated with the specific culture of root nodule organisms prior to sowing. The trials were so manipulated that the population of the seedlings in each plot was about the same.

At interval of 15, 30, 45 and 60 days after sowing, 20 plants selected at random were carefully lifted from each plot, the root system washed and the nodules counted (one confluent cluster being counted as one) and the average number of nodules per plant was calculated. The average shoot length per plant was also measured for the same intervals.

At the end of 60 days the plants from each plot were lifted, and after washing the root system, and draining the excess water, the fresh weight of the whole plants was recorded. Moisture was determined in the plant samples and representative samples were collected from each plot for the determination of total nitrogen content.

Soil samples (0-12") were collected from the plots before sowing and after harvest of the crop, both for chemical and biological analysis. These samples were analysed for:

- Available phosphoric acid, by extraction with 1 percent citric acid.
- Total nitrogen by the Kjeldahl method as modified by Bal (1925).
- Organic carbon as determined by the Walkley and Black's method (Walkley and Black 1934).

Composite soil samples for each treatment were prepared by mixing equal quantities of soil samples collected for the purpose of biological analyses, from each of the four replicated plots, under each treatment and the following assays were carried out:

- pH in 1:5 soil solution by the Beckmann pH meter
- Microbial population by planting on Thornton's agar medium (Waksman 1932)
- Biological activity as measured by the Waksman and Starkey's method (Waksman and Starkey 1924).

Results and Discussion: *Nodul formation:* The average number of nodules per plant under the different treatments at different stages of growth are given in Table II. Differences among the treatments are highly significant (at 1% level). The 'no manure' treatment produced the least number of nodules at every stage. The number of nodules per plant progressively increased with the age of the plant, as is evidenced by the period mean.

TABLE II
Average number of nodules per plant

Period	Treatment means								Period mean	C. D. at 1% for comparison of any two treatment for the different periods
	A	B	C	D	E	F	G	H		
15 days after sowing	1.34	3.82	1.94	2.49	4.22	4.38	2.45	3.72	3.05	1.50
30 days after sowing	2.98	16.80	4.81	4.73	16.76	16.58	6.26	17.91	10.85	3.80
45 days after sowing	10.19	28.29	18.13	18.41	30.30	34.43	20.80	38.34	24.96	11.26
60 days after sowing	37.96	97.50	74.60	57.65	93.89	76.63	53.46	91.43	72.88	31.86

Treatments involving lime are distinctly superior to treatments without addition of lime. But there is no significant difference among treatments receiving lime. Superphosphate or farm yard manure either singly or in combination are not superior to the 'no manure' control, but in combination with lime do give better results, indicating the absolute necessity of lime to bring about the full effect of either superphosphate or farmyard manure in promoting the nodule formation. The results are in conformity with those obtained by Fellers (1918) who reported that application of acid phosphate to limed plots was effective in increasing nodulation of soyabean, but exerted little or no effect upon unlimed soil. This also falls in line with the conclusions of Bear (1917) with regard to the beneficial effects of lime on the nodulated system.

Shoot Length: The average shoot length of the plants are presented in table III. It is seen from the data that the response to the different treatments is similar to that of nodule formation trend. The same is also maintained in the vegetative growth.

TABLE III
Average shoot length in Cms.

Period	Treatment mean									C. D. 1% for comparison of any two treatments for the different periods
	A	B	C	D	E	F	G	H	Period mean	
15 days after sowing	7.74	9.25	8.40	8.12	9.32	9.95	8.48	9.65	8.86	0.98
30 days after sowing	13.93	21.11	15.88	16.57	22.59	24.95	17.40	26.80	19.91	3.18
45 days after sowing	30.52	36.20	34.38	33.05	48.50	55.07	32.97	60.25	41.24	9.92
60 days after sowing	76.78	112.69	85.53	81.75	126.85	108.70	86.16	120.08	98.56	23.12

Yield of green matter: Table IV gives the average yield of green matter at harvest, after 60 days' growth of the crop. The yield data relating to green matter indicate that effects due to treatments are highly significant at 1% level. There is no significant difference between lime alone or in combination with superphosphate or farmyard manure. Application of superphosphate at 30 lb. P_2O_5 level has not significantly increased the yield over the 'no manure'

control. Lime combined with superphosphate or farmyard manure is better than lime with super or lime with farmyard manure. All the three combinations are necessary to bring about the maximum advantage in the condition of the soil for the growth and nodulation of *Sesbania speciosa*.

TABLE IV
(Mean yield of green matter in lb. per acre)

Treatment	A	B	C	D	E	F	G	H
Yield (lb.)	19122	27295	19590	25283	30743	32295	23718	36075
Conclusions	H	F	E	B	D	G	C	A

Nitrogen, carbon and available phosphoric acid contents of soil: The data on the mean content of total nitrogen, organic carbon and available phosphoric acid in soils under the different treatments, collected before sowing and after harvest of *Sesbania* crop are presented in table V.

TABLE V
Average nitrogen, carbon and available phosphoric acid content of soil.

Treatment	Nitrogen		Organic Carbon		Available Phosphoric Acid (Mgm)	
	Before Sowing	After Harvest	Before Sowing	After Harvest	Before Sowing	After Harvest
A	.144	.151	1.16	1.06	51	55
B	.150	.153	1.21	1.07	61	52
C	.141	.150	1.12	1.09	57	55
D	.155	.157	1.14	1.13	71	55
E	.141	.156	1.15	1.15	70	59
F	.139	.162	1.13	1.15	62	53
G	.144	.160	1.19	1.13	57	55
H	.143	.148	1.14	1.12	59	59

From the figures it is seen that there is no significant variation in these soil characteristics, due to the growth of the *Sesbania* crop. However, there is an apparent increase in the nitrogen content of soils after the growth of the legume, which can be attributed to the diffusion of nitrogen from the roots and to the decay of older root nodules in the soil (Virtanen 1947) which undergo mineralisation slowly.

pH and microbial population: The pH of the composite soil samples under the different treatments are given in Table VI

TABLE VI
pH and Bacterial Counts

Treatments	Before Sowing		After Harvest	
	ph	No. of micro organisms in lakhs per gram of soil	PH	No. of micro organisms in lakhs per gram of soil
A	5.80	4.8	5.48	1.4
B	6.18	15.2	5.80	15.3
C	5.64	7.2	5.20	7.3
D	5.78	8.2	5.30	8.5
E	6.28	16.2	5.78	16.2
F	6.29	11.8	5.80	12.8
G	5.99	8.7	5.70	8.4
H	6.14	21.0	5.90	21.2

The microbial population of these soils were estimated by the plating method using Thorntons' agar medium. A dilution of 1 in 100,000 was found to give satisfactory counts on the plates. Four plates were used for each soil. The results obtained are given in Table VI.

It is seen that the limed plots have a higher pH generally. The plots receiving the lime treatment have also recorded a higher yield and better nodulation. This is in agreement with Joffee (1920) who recorded the greatest number of nodules and the greatest gain in nitrogen in the plants growing in soils of nearly neutral reaction. Bryan (1922) made similar observations with alfalfa, clover, cowpea, and soyabeans raised in nutrient solutions of varying concentrations.

Where superphosphate alone was applied there is a slight increase in soil acidity. Though farmyard manure, by itself has not mitigated the condition, in combination with lime, it has improved the soil reaction. The combination of all the three amendments viz. lime, super and farm yard manure has also raised the pH.

The pH of the soils after the harvest of the crop is slightly lower in all the series as compared with that before sowing, probably due to the uptake of lime by the crop.

Microbial population: The figures indicate that all the treatments have recorded higher bacterial numbers in the soil, than the control. Among the treatments the limed plots have higher bacterial

numbers than the unlimed series. Super and farmyard manure alone and in combination also exert some influence on the soil population. The highest numbers are present in the plots receiving a combination of lime, super and farmyard manure. The results also indicate that there is very little variation in the numbers found before and after the crop.

Biological activity: The daily evolution of carbondioxide due to microbial activity was determined in the composite soil samples under the different manurial treatments. The experiments were carried out with 100 gm. of the sieved soils, to which organic matter in the form of 1 gram glucose had been added, and moistened to a level of 50% of the water-holding capacity of the soil and incubated at room temperature. Controls with soils alone were also run simultaneously for working out the percentage increases of CO₂ evolved due to biological activity in the samples treated with carbohydrate.

From the estimation of CO₂ evolved, the daily average production of CO₂ was worked out and the data are given in Table VII.

TABLE VII
Daily average production of CO₂

Treatments	Soil Samples Before Sowing				Soil Samples After Harvest			
	Mgm of CO ₂ . Soil alone	Soil + 1% glucose	Difference due to glucose	Percentage increase due to glucose	Mgm of CO ₂ . Soil alone	Soil + 1% glucose	Difference due to glucose	Percentage increase due to glucose
A	7.5	19.6	12.1	161.4	5.1	19.3	14.2	278.8
B	17.2	31.2	14.0	82.0	15.5	24.9	8.5	55.2
C	28.2	33.9	5.7	20.3	22.1	31.2	9.1	40.9
D	39.6	41.4	1.8	4.4	33.0	35.9	2.9	8.7
E	37.8	40.7	2.9	7.6	29.5	31.7	2.2	7.4
F	7.0	18.5	11.5	162.5	4.5	18.3	13.8	309.0
G	18.3	28.4	10.1	55.4	19.2	26.0	6.8	35.4
H	33.2	42.9	9.7	29.1	29.9	33.6	3.6	11.8

From the data it would be seen that there is a general increase in the microbiological activity due to the application of the different amendments. In all cases there is a definite response to the added organic matter. The microbiological activity of the soil as revealed by the carbon dioxide evolution and the microbial

population seems to be influenced by the amendments than by cropping. There is a general slackening of the biological activity after the harvest of the crop. Considering both the population and activity it is seen the highest counts are found in the treatment receiving lime, super phosphate and farm yard manure. The greatest quantity of carbon dioxide was evolved from the treatment, receiving farmyard manure though the number of organisms was considerably less. This seems to be due to the composition of the micro-organisms such as fungi and bacteria and it is known that acid range of soil reaction is more favourable for moulds than bacteria and vice-versa. The addition of farm yard manure also assists the development of fungal growth. In general it is found that combination of lime, P_2O_5 and farm yard manure provides a good condition in the soil for microbial growth and activity thus tending to increase their fertility.

Analysis of plant samples: The *Sesbania* crop was harvested after two months' growth and the dry matter weight was deduced from the green matter yield and moisture per cent. Representative plant samples under the different treatments were analysed for total nitrogen content. The nitrogen content of the harvested crop in each plot, was calculated. The average figures of dry matter yielded are given in Table VIII.

TABLE VIII
Average dry matter weight
(Expressed in lb. per acre)

Treatment	A	B	C	D	E	F	G	H	C. D. at 1% level
Lb./acre	5697	7699	5706	7373	8911	9429	7023	10870	1230
Conclusion	H		F	E	B	D	G	C	A

Dry matter: The data on the dry matter yield after two months' growth of the crop, are highly significant (at 1% level) and are similar to the green matter yields (vide Table IV).

Total nitrogen content: The data (Vide Table IX) are significant at 5% level. The results indicate that the combination of lime, superphosphate and farm yard manure bring about the maximum return, in the form of nitrogen in the harvested crop, which nitrogen could be incorporated into the soil. It may be seen that nearly 122 lb of nitrogen is obtained by this way as against 78 lb from 'no manure' plot for a two month old crop.

TABLE IX
Average Nitrogen Content of *Sesbania* Plant
(Expressed in lb. per acre)

Treatment	A	B	C	D	E	F	G	H	C. D. at 1% level
Lb./per acre	78.2	103.1	84.5	102.1	104.4	105.7	89.4	121.8	21.7
Conclusion	H		F	E	B	D	G	C	A

Summary and Conclusion: A field trial was conducted during 1955 at the Agricultural Research Station, Pattambi, to find out the ideal conditions for best nodulation and growth of *Sesbania speciosa* good. The changes in the soil condition were also studied. The extent of growth, green matter yielded and the nitrogen contained in the crop were assessed.

The factors of particular importance for the best performance of legumes are the physical properties of the soil to hold and to release water and air to the plant, the acidity or alkalinity of the soil and its content of necessary nutrients. Provided the soil contains and permits a ready flow of water and air and is free from concentrations of soluble salts, the factors of importance are the pH value and availability of essential nutrients.

There are good indications that legumes for green manure purposes can profitably be raised in the laterite soils of Malabar by providing amendments like lime, and adding organic matter such as farm yard manure and phosphoric acid. As stated by Whyte *et al* (1953) calcium not only sweetens the soil but also facilitates the release of certain nutrients in an available form. It has been found that if sufficient calcium is available as a nutrient, and the other essential nutrients are not lacking and the soil is in a good physical condition, the degree of acidity or alkalinity may not have much influence within certain limits. The trials have clearly indicated this, namely that for effective nodulation of legumes and improving their growth a combination of lime at 1500 lb. superphosphate at 30 lb P_2O_5 , and farm yard manure at 5000 lb. per acre was the best as it increased the yield by 80 per cent over the control adding 44 lb. more nitrogen per acre.

The difference in the contents of nitrogen, organic carbon, available phosphoric acid, pH and bacterial numbers of the soils after application of the amendments, and after harvest of the crop were not significant i. e. these soil characteristics were not influenced by the growing of the *sesbania* crop.

The excellent growth of green manure seems to be due to the availability of lime and phosphoric acid than due to the change in soil reaction alone which is very little. This is clear from the poor base status and lack of available nutrients in the soils before the use of the amendment and fertiliser. The farm yard manure helps to retain more moisture as well as the soluble plant nutrients. The importance of organic matter content of soil for the better assimilation of phosphate by legumes and the need for phosphate has also been stressed by Sanyasi Raju (1953).

Acknowledgements: The authors' acknowledgements are due to the Assistant Paddy Specialist, Agricultural Research Station, Pattambi for facilities provided for the conduct of the field experiments, during the year 1955.

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Notes on a larval ectoparasite (*Bracon Sp. Hymenoptera*) on Rice Hispa (*Hispa armigera Ol*) aenescs Baly in Nizamabad District, Hyderabad State

by

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Introduction: Amongst the major insect pests occurring on Rice crop in Hyderabad State, *Hispa* (*Hispa armigera Ol.*) occupies the most important place. It occurs on both the *abi* seasonal crop which is sown in the months of June-July and *tabi* crop which is sown in the months of January-February.

Apart from Hyderabad State, *Hispa* also occurs as a pest of rice crop in West Bengal, Madhya Pradesh, Bombay, Orissa, Madras and Andhra States in the Indian Union. Padwick (1948) in a review on plant protection and food crops in India mentions that it is present throughout the year in Assam and Bengal and that in 1946 it took a heavy toll of 20,000 acres of crop in Madhya Pradesh, causing an average loss of over 20% in yield. Outside India, the pest is found on Rice Crop in the Republic of China, Formosa, Indonesia and Pakistan. According to Chu (1938), hispa destroyed 3,000 acres of early rice in Pho-lo district in Kwangtung province in China in 1932. Recently, Shen and Kung (1954) have reported that serious out breaks of Rice hispa have occurred in the past few years in Taiwan island, infestation occurring on tens of thousands of hectares.

It is very surprising that in view of its importance in many rice growing countries, nothing seems to be known about its natural enemies. Logothetis (1951), who has reviewed the published work on rice insect pests in S. E. Asia has not mentioned any natural enemy of this important pest. The following notes deal with a larval parasite obtained on Rice hispa in the perennial irrigated zone of Nizamabad district, Hyderabad State. The authors believe that this is the first published report of a natural enemy of the above.

Seasonal History of Rice Hispa: A brief note on the seasonal history of *Rice hispa* is essential in fully understanding the utility or otherwise of the parasite. As already mentioned above the *abi*

seasonal crop is sown in the months of June–July. The crop sown during the above season is a long duration one and transplanting of the crop is common. The nurseries are sown early in June or sometimes even in last fortnight of May. During this period the pest is observed in few numbers on the sprouted stubbles of the previous seasonal crop and early sown nurseries. Soon after the first showers in June, copulation and egg-laying are observed. The first brood adults emerge by 3rd week of July. The transplanting of the *abi* crop will be in full swing at this time. The 2nd brood adults emerge by last week of August. This brood is the most destructive and wide-spread. A small third brood is observed by last week of September but the attack dwindles down and only few adults are observed in October and November on very late sown crops. These adults transfer themselves to germinated stubble crop or early sown *tabi* nursery in 2nd week of December. The 4th brood adults emerge by last week of January and spread on a wide scale. The 5th brood adults emerges by 25th of February and are very harmful to the *tabi* crop. A partial 6th brood emerges by last week of March. Attack dwindles down from here on and adults migrate to early harvested crop stubbles (sprouted).

As already said, it is the 2nd brood that is most destructive in *abi* season and the 5th brood in *tabi* season. The pest population would be at its maximum at these periods and the crops in general would be in their 'active tillering' and 'elongation' stage. Broadly speaking, *abi* crop is safe after August as it would have sufficiently grown to withstand further attack by this pest. The same can be said of *tabi* seasonal crop after February. Observations made by the authors have shown that *Hispa* attack reduces effective tillering in rice crop considerably.

Brief description of the parasite and Biological notes: The *Bracon* sp. (*Braconidae*: Hymenoptera) is an ectophagous larval parasite. The body of the adult female is in general brown in colour and measures 2.5 in length and 1.0 mm in width. The eyes are black; Antennae is dark brown, 22 jointed and 3.0 mm in length. Abdomen is compressed, 0.8 mm long and 1.0 mm broad. Ovipositor is black in colour and 0.1 mm in length. Forewings are hyaline with brownish tinge and measure 3.5 mm x 1.0 mm.

Multiple-parasitism is very common. Host grubs with less than two parasite larvae are rarely encountered. This cannot be attributed to lesser host density or lack of suitable stage of host

grubs. Only medium to full grown grubs are mostly attacked. The full grown parasite larva is white in colour and 3.0 mm in length. After full grown, the parasite spins a cocoon and pupates in the same leaf mine as that of the host. The pupal cocoon is dull white in colour, tough and elliptical. The cocoons are closely packed in the leaf mine. The pupal stage averages six days and the adult emerges out of the cocoon by cutting a neat circular cap at one end. The parasites are short lived, average longevity being 5 days.

Incidence in Nature: The parasite was first observed in March 1957 in Bodhan taluka on *tabi* crop. It was not encountered in 1948 but was got again in last week of August 1949 when 40% of grubs were found attacked. Regular monthly observations were started in 1950 on *abi* and *tabi* seasonal crops which are given below:—

Season	Abi Season			Tabi Season			
	June	July	Aug.	Sept.	Jan.	Feb.	March
1950	Nil	Nil	45%	82%	Nil	Nil	Nil
1951	Nil	Nil	56%	80%	Nil	Nil	Nil
1952	Nil	Nil	42.5%	70%	Nil	Nil	41%
1953	—	—	Not observed	—	—	—	—
1954	15%	35%	74.5%	—	—	—	—

Two points emerge out of these field collections. The parasite which was first observed in *tabi* season in 1947, was not observed again on *tabi* seasonable crop till 1953. In *abi* season, the parasite which used to be active only after the first fortnight of August till 1952, is now observed as early as last week of June.

An appraisal of the value of the parasite: Till 1953, it was estimated that the parasite was not of much practical utility on the basis of the following points.

- Its appearance and activity from August onwards. As observed already, this coincides with the emergency of 3rd brood of *Hispa* in *abi* season when maximum damage by the pest would have already occurred and the crop sufficiently grown up to withstand further attack.
- Selection of mainly medium to full grown grubs for parasitisation. Sufficient damage would have occurred already to the crop by the early instar grubs.
- Its almost complete absence in *tabi* season. *Hispa* is equally destructive to *tabi* seasonal crop as well.
- Occurrence of multiple parasitism with the attendant defects.

As a result of recent observations, however, it has become necessary to revise our estimate. The almost total disappearance of Hispa in the endemic area of Bodhan taluk a zone of 'normal outbreak' from 1953 onwards appears to be mainly due to the natural check exercised by this parasite as well as the other two minor natural enemies not dealt with here. The area that used to be infested annually by Rice Hispa in Bodhan taluk is given below:—

Year	Area infested in acres
1949	228-00
1950	395-00
1951	138-00
1952	369-00
1953	15-00
1954	12-00 (upto end of August)

The causes of reduction in population of this important pest from the past 3 crop seasons has been preliminarily studied from the following angles:

- (1) Climatological factors.
- (2) Intensification of Plant Protection measures since 1950 against the pest
- (3) Changes in the practice of rice cultivation, especially adoption of high doses of artificial fertilisers to stimulate the growth and yield of the crop.

These studies reveal that inspite of the above factors being uniform in other parts of the district, it is only in Bodhan taluk that the pest has recorded a reduction almost approaching to eradication. This has got to be attributed mainly to the effect of the parasite on the pest.

The parasite has been recorded from all the three taluk in the perennial zone of Nizamabad district viz., Bodhan Banswada and Nizamabad. The following table gives the incidence of parasitisation recorded during the current year at various localities.

Table showing percentage Parasitism of *Bracon* Sp. during Abil 1954 — '55 season in Nizamabad District

Date	Locality (taluka)	% Incidence
26-6-1954	Kamareddy (Kamareddy)	Nil.
29-6-1954	Bodhan (Bodhan)	15%
4-7-1954	Kamareddy (Kamareddy)	Nil.
7-7-1954	Alisagar (Bodhan)	60%
26-7-1954	Borgaon (Nizamabad)	24%
27-7-1954	Rudroor (Bodhan)	64.3%

Date	Locality (taluka)	% Incidence
27-7-1954	Jankempet (Bodhan)	16.6%
31-7-1954	Banswada (Banswada)	10.0%
7-8-1954	Borgaon (Nizamabad)	82.0%
16-8-1954	Rudroor Farm (Bodhan)	50%
22-8-1954	Borgaon (Mozamabad)	84.0%
23-8-1954	Banswada (Banswada)	63.0%
24-8-1954	Humnapur (Bodhan)	90.0%
24-8-1954	Rudroor Farm (Bodhan)	50.0%
25-8-1954	Ghanpur (Bodhan)	93.0%
26-8-1954	Mosrah (Bodhan)	84.0%

Hyperparasites: *Eupteromalus* sp. (*Chalcidoidea*: *Pteromalidae*) has been observed as a secondary parasite. It has also been got as a primary parasite as well. Other hyperparasites observed are *Dimmockia* sp. and *Achrysocharia cardigaster* Masi (*Chalcidoidea*: *Eulophidea*)

Summary: Hispa (*Hispa armigera* Ol.) is a major insect pest of rice crop in Hyderabad State observed on both *abi* and *tabi* seasonal crops sown in June-July and January-February respectively. Apart from Hyderabad State, it is found in almost all major rice growing states of the Indian Union, and also in the Republic of China, Taiwan, Indonesia and Pakistan. In spite of such a wide distribution, information on its natural enemies is lacking. The paper deals with larval ectoparasite (*Bracon* sp.) on Hispa observed in the perennial irrigated zone of Nizamabad District in Hyderabad State. Brief description of the parasite and its seasonal incidence in relation to the pest is given. An appraisal of its value as a natural factor in keeping rice hispa under control is also made. The parasite appears promising and the present decline in the incidence of the pest in the Bodhan Taluk—an endemic area noted for its regularity for Hispa infestation is mainly attributed to this parasite, apart from two other minor natural enemies not dealt with. Three hyperparasite have also been observed.

Acknowledgements: Thanks are due to the Head of the Division of Entomology, Indian Agricultural Research Institute, New Delhi and British Museum (Natural History), London, for help rendered in the identification of the parasites.

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The Flora of Adyar*

by

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Adyar is an enhancing place. One main reason for this is undoubtedly to be found in the exuberant vegetation which consists of different kinds of assorted plants, partly indigenous and partly introduced, both combined into a beautiful mosaic by nature as well as by design in which may be seen the work of the Hidden Artist. The rich and varied flora consisting of over two hundred and fifty species excluding the potted ornamentals, and belonging to various genera and families is well worth study by a trained botanist. Herbs, shrubs and climbers: trees large and small, evergreen and deciduous; palms and bamboos; grasses and weeds and the humble denizens of the pond, meet the eye at different levels and form an effective scenery of considerable beauty.

To understand the composition and distribution of the flora it is only necessary to know that.

- i. the average annual rainfall as recorded for the Madras city is about fifty inches, most of it falling from October to December in the North East monsoon.
- ii. the soil is predominantly sandy and
- iii. the water table is within six to ten feet.

As is well known Adyar is bounded immediately on the north by the river which goes by the same name and on the east by the Bay of Bengal. Proximity to the sea, the loose sandy soil, medium rainfall and humid atmosphere under the tropical sun, support an interesting and characteristic type of vegetation native to the soil which has been greatly enriched by the introduction and acclimatisation of very many exotic species.

The conspicuous part of the north consists of the coconut palms (*Cocos nucifera* Linn.) and the casuarina (*Casuarina equisetifolia* Forst) which dominate the whole vegetation by their height. Things are different as one enters the Adyar Estate. Right within the entrance to the left are a few Phoenix palms (*Phoenix dactylifera* Linn.) with *Pongamia glabra* Vent. and neem trees (*Margosa*, *Azadirachta indica*

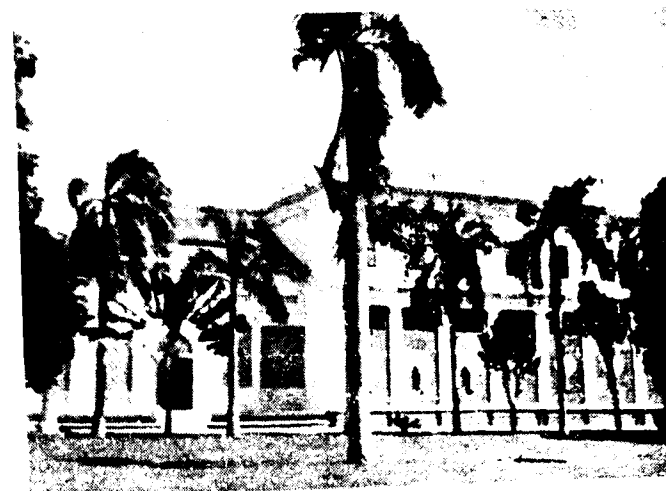
* Adyar is the International Head-quarters of the Theosophical Society.



The Adyar River on the side of Adyar Estate



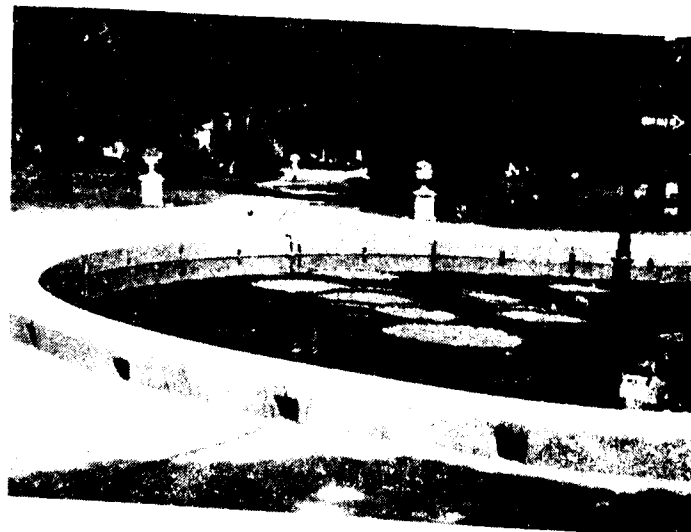
A view of the Estate from the gate



The Headquarters Building with Palms



The Famous banyan tree with seventy pillars



Victoria regia

A. Juss.) and to the right are trees of Guanacaste (*Enterolobium cyclocarpum* Griseb.), one *Jacaranda mimosaeifolia* D. Don., the Royal palm (*Oreodoxa regia* H. B. K.) on both the sides and the Sand box (*Hura crepitans* Linn.) Further within are, old trees of neem, the tamarind (*Tamarindus indica* Linn.), wood apple (*Feronia elephantum* Corr.) and *Cassia siamea* Lam. at a distance. The avenue may be said to begin with an old banyan (*Ficus bengalensis* Linn.) to the left and another banyan a few yards off to the right but it soon changes to long rows of coconuts on both sides interrupted on the right by a few trees of the jambo (*Syzigium jambolanum* DC.) and a mango (*Mangifera indica* Linn.) both as old as the banyan, changing again to miscellaneous kinds of trees in the further ramification of the estate.

The centre of attraction in the whole vegetation is the famous banyan tree, near the Blavatsky hall which is the meeting place for large gathering and is for this reason specially looked after and well kept. There are over dozen specimens of this magnificent tree scattered over the estate but the above one near the Blavasky building is the most beloved of all. It was reported in the 'Theosophist' for October 1927 (page 40) that the tree and its branches were supported by seventy aerial roots most of them specially trained to get into the ground to serve as 'natural pillars'. Brothers to the banyan are three other species of *Ficus* viz., *F. glomerata* Roxb., the wild Indian fig. *Ficus religiosa* L., the Bo tree, Pipul or Aswatha both tall trees with ascending branches and *F. retusa* Linn., adopting in a way the spreading habit of banyan with fewer aerial roots. A very interesting and rare *Ficus* is *F. Krishna* near the Hindu temple, characterised by funnel shaped leaves.

The quick growing and shade giving rain tree (*Enterolobium saman* Prain) does well indeed and also the less useful gul mohr or gold Muhur (*Delonix regia* Raf.). Sirish (*Albizia lebbeck* Benth.) with dry pods long persisting and *Peltophorum ferrugineum* Benth., attractive by means of its yellow flowers are other popular trees of the same family (Leguminosae) widely planted on the estate. A good specimen of mahogany (*Swietenia mahagoni* Linn.) exists which is many years old and young plants have established in the newly formed avenues alternating in some places with the peacock flowers (*Caesalpinia pulcherrima* Sw.) The Indian laurel (*Calophyllum inophyllum* Linn.) with glossy leaves and balls of white flowers, (*Cerbera manghas* L.) of handsome foliage, flowers and light fruits,

(*Barringtonia acutangula* Gaertn.) with long pendulous racemes of flowers and (*Wrightia tinctoria* R. Br.) with delicate white flowers and pencil shaped fruits in pairs are some of the trees peculiar to littoral areas.

Distributed within the estate in smaller or larger numbers are the following well known trees of S. India, each interesting and useful in its own way:— the deciduous *Odina wodier* Roxb., propagated by stumps; the deformed evergreen and night flowering *Morinda tinctoria* Roxb., the Indian beach *Pongamia glabra* Vent., the familiar Indian Tulip (*Thespesia populnea* Cav.) the ironwood (*Cassia siamea* Lam.) the thorny *Pithecolobium dulce* Benth., with peculiar twisted pods and edible aril, Bastard Cedar (*Guazuma tomentosa* Kunth.) Divi-Divi (*Caesalpinia coriaria* Willd.) *Cassia marginata* Roxb., *C. glauca* Lam., and many others.

Among the larger trees may be noticed the interesting Australian *Acacia auriculiformis* A. Cunn., quite attractive when in flower but not less so even with its foliage which consists not of leaves but leaf like phyllodes; the tall night flowering Indian cork *Millingtonia hortensis* L. f., with its long pendant white flowers in bunches shedding silver white corolla tubes during the day; the curiously flowered cannon ball tree (*Couropita guianensis* Hook.) sweet scented (*Guetarda speciosa* Linn.) to which may be added the following noteworthy features of interest to the lover of plants; the Baobab (*Adansonia digitata* Linn.) of Africa whose trunk is the most massive of all trees, the red silk cotton tree (*Bombax malabaricum* DC.), *Mimusops elengi* Linn., with inconspicuous but fragrant flowers dropping by gentle showers by the wind, the Trincomaliwood (*Berrya ammonilla* Roxb.) the lemon scented *Eucalyptus citriodora* Hook., the sinuous leaved *Polyalthia longifolia* Hk. f., the Silver oak (*Grevillia robusta* A. Cunn.) the scarlet seeded *Adenantha pavonina* Linn., the queens flower *Lagerstroemia flos-reginae* Retz., with mauve coloured flowers of much beautiful structure, the tree lettuce (*Pisonia morindifolia* R. Br.) the Traveller's palm *Revenala madagascarensis* Sonn., of striking appearance and the valuable sandal wood (*Santalum album* Linn.) a root parasite.

Much of the beauty of Adyar is due to the palms of which there are many good examples. The coconut being the chief and prominent, the following deserve mention viz., the palmyra (*Borassus flabellifer* Linn.) the wild date (*Phoenix sylvestris* Roxb.) the introduced stately and ornamental Royal Palm or Bottle palm

(*Oreodoxa regia* H. B. K.) the Malabar sago palm (*Caryota urens* Linn.) and arecanut (*Areca catechu* Linn.) The introduced species of *Livistonia* R. Br., *Pritchardia*, *Thrinax* and *Raphis* are valuable additions to this notable group of plants. Bamboos too have a charm of their own and their presence in a few places gives a natural and wild aspect to the scenery. The uses of this giant grass for construction and other purposes are too well known to require mention and doubtless it is one of the useful plants of Adyar.

Trees of Economic importance have always received attention at Adyar. Of these though the coconut and casuarina have been planted on a large scale as paying crops there are other useful trees such as the evergreen mango (*Mangifera indica* Linn.) of which there are quite a large number including grafted varieties, the hardy tamarind, (*Tamarindus indica* Linn.) the big fruited Jack, (*Artocarpus heterophyllus* Lam.) the mango like mahu (*Bassia longifolia* Linn.) the curiously fruited cashewnut (*Anacardium occidentale* Linn.), the soapnut (*Sapindus emarginatus* Vahl.) not to mention the fruit trees and shrubs of the orchard viz., the orange (*Citrus sinensis* Pers.) pumelo (*C. grandis* Murr.) sapota (*Achras sapota* Linn.) Pine apple (*Ananas sativus* Scult.) Avacado pear (*Persea gratissima* Gaertn.) plantain (*Musa sapientum* Linn.) etc., and the less valuable wood apple (*Feronia elephantum* Corr.), guava (*Psidium guajava* L.) and papaya (*Carica papaya* Linn.) and the rarer ones like *Averrhoa bilimbi* Linn. and *A. carambola* Linn.

As important as the trees in making Adyar picturesque are the numerous shrubs and climbers which by their variegated foliage or brilliance of colour form an attractive feature of the vegetation. The different varieties and hybrids of "Shoe flower" (*Hibiscus rosa-sinensis* Linn.) unhappily so called, *H. schizopetalus* of hand-rosa-sinensis Linn.) some flowers, the oleander (*Nerium odorum* Soland.) with white, pink or red and single or double flowers, the peacock flowers (*Caesalpinia pulcherrima* Sw.) the white flowered *Ervatamia coronaria* Stapf., the night flowering and popular *Nyctanthes arbor-tristis* Linn., the yellow flowered *Thevetia neriifolia* Juss., and the Queen of the night (*Cestrum Stenolobium stans* D. Don.) the scarlet flowered *Ixora*, the pretty *Bauhinias nocturnum* Linn.), the dwarf palms are some of the ornamental shrubs which have been variously distributed in the garden with striking effect.

The *Bougainvilleas* are a special delight. The peculiarity of the flowers which are set in threes are by themselves inconspicuous but are enveloped by beautifully coloured bracts subtending each

flower. *B. spectabilis* Willd. is the common species with deep purple bracteal leaves and though essentially a climbing shrub lends itself remarkably well for hedges, borders, arches and trellies of various designs. Two other varieties of hybrids are seen viz., *Mrs. Butt* and *Laterita*. A shy flowering white variety is also grown with much care.

Other noteworthy climbers of much ornamental value are the Malathi (*Aganosma dichotoma* K. Schum.), *Allamanda cathartica* Linn., with larger yellow flowers, *Hiptage madablata* Gaertn., (corrupt for sanskrit Madhavilatha), strong scented *Jasminum sambac* Ait., and *J. grandiflorum* Linn., *Passiflora* sp., the sweet scented *Telosma minor* Craib., with greenish bell shaped flowers, *Porana paniculata* Roxb., the bridal creeper, *Pothos scandens* Linn., *Quisqualis indica* Linn., the Rangoon Creeper and the common *Antigonon leptopus* Hook., with white or pink flowers.

Of particular interest to the Botanist is the association of plants confined to the ponds of Adyar and may be seen in an active growth during sometime or other of the year. The sacred lotus (*Nelumbium speciosum* Willd.) and the water lily (*Nymphaea stellata* Willd.) thrive well with proper care and the American *Victoria regia* which has covered the entire pond opposite the large banyan and the aggressive but attractive Water hyacinth (*Eichhornia crassipes* Solms.) Bull nut or the water chestnut (*Trapa bispinosa* Roxb.) is slowly becoming extinct, possessing other interesting features of adaptation in its roots and leaves and is much valued as food in North India owing to the starchy fruits which are sold under the name Singada nut. Less conspicuous but more successful than the above in the struggle for existence are the following completely submerged plants viz., *Chara*, *Ceratophyllum demersum* Linn., *Hydrilla verticillata* Royle., *Najas graminea* Del. The very small duckweed (*Lemna gibba* Linn.) *Wolfia mechellii*, Schied., the smallest known of the flowering plants and the Water fern (*Azolla*) are however free floaters.

In the mud flat near the mouth of the river (Adyar) and confined to this habitat only is a small tree *Excoecaria agallocha* L. which is of interest to the ecologist. Of similar interest are the soil binders of which there are a few interesting examples.

Much of the largest group of plants next to trees from the point of view of number of species consist of "what the dull incurious weeds account" and a glance at the list appended at the end will

The Flora of Adyar

give an idea of the contribution made by these lowly plants to the richness of the flora of Adyar. About these weeds which adorn the grounds of Adyar and all our "fellow residents of the vegetable kingdom" it has been well said that "they have their importance hardly less than our own and Adyar is theirs almost as much as it is ours". We may therefore know them well.

TREE FLORA

- Acacia arabica* Willd. — *Babul*
- Acacia auriculiformis* Buch. Ham
- Achras sapota* L. — *Sapota*
- Adansonia digitata* L. — *Baobab*
- Adenanthera pavonina* L. — *Bead tree*
- Albizia amara* Boiv.
- A. lebeck* Benth. — *Sirish*
- Anacardium occidentale* L. — *Cashewnut*
- Anona squamosa* L. — *Custard apple*
- Araucaria* sp.
- Areca catechu* L. — *Arecanut palm*
- Artocarpus incisa* Linn. — *Bread fruit*
- A. heterophyllus* Lam. — *Jack* — (*A. integrifolia* Thumb)
- Atalantia missionsis* Oliv. — *Wild lime*
- Averrhoa bilimbi* L.
- A. carambola* L.
- Azadirachta indica* A. Juss. — *Neem, Margosa*
- Bambusa* sp.
- Barringtonia acutangula* Gaertn
- Bassia longifolia* L. — (*Madhuca longifolia* L.)
- Bauhinia krugii* urban
- B. purpurea* L.
- Berrya ammonilla* Roxb. — *Trincomali wood*
- Bombax malabaricum* DC. — *Red cotton tree*
- Borassus flabellifer* L. — *Palmyra palm*
- Caesalpinia coriaria* Willd. — *Divi - Divi*
- Calophyllum inophyllum* L. — *Alexandrian Laurel*
- Carica papaya* L. — *Papaw, Papaya*
- Caryota urens* L. — *Bastard sago, Kitul palm, Fish tail palm*
- Cassia glauca* Lam., Var. *suffruticosa* Prain
- Cassia marginata* Roxb.
- C. siamea* Lam.
- Casuarina equisetifolia* Forst. — *She oak, Beef wood*
- Cerbera manghas* L.
- Cicca disticha* L. — *Star-gooseberry*
- Citrus sinensis* Pers. — *orange*
- C. grandis* Mur. — *pumelo*

C. medica L. — *Lime*
Cocos nucifera L. — *Coconut palm*
Cordia obliqua Willd.
Couropita guianensis Hk. — *Cannon-ball tree*
Crataeva religiosa Forst.
Delonix regia Raf. — *Gul Mohr, Flamboyant tree*
Diospyros sp.
Dracaena fragrans Ker Gawl.
Enterolobium cyclocarpum Gr. — *Guancaste*
E. saman Prain
Erythrina indica Lam. — *Coral tree*
Eucalyptus citriodora Hook.
Euphorbia tirucalli Linn.
Excoecaria agallocha Linn.
Feronia elephantum Corr. — *Wood apple*
Ficus bengalensis L. — *Banyan*
F. religiosa Linn. — *pipul*
F. retusa Linn.
Filicium decipiens Thw.
Grevillia robusta A. Cunn. — *Silver Oak*
Guazuma tomentosa Kunth. — *Bastard cedar*
Guettarda speciosa Linn.
Hura crepitans Linn. — *Sand box tree*
Ixora parviflora Vahl. — *Torch tree*
Kigelia pinnata D. C.
Kleinhovia hospitata Linn.
Lagerstroemia flos-reginae Retz. — *Queens flower* — (*L. speciosa* Pers)
Leucaena glauca Benth
Livistonia sp.
Mangifera indica L. — *Mango*
Melia azadirach Linn. — *Persian Lilac*
Millingtonia hortensis Linn. f. — *Indian Cork*
Mimusops elengi Linn.
Morinda tinctoria Roxb.
Moringa oleifera Lam. — *Horse Radish, Drumstick*
Murraya exotica Linn.
M. koenigii Spr. — *Curry leaf*
Musa sapientum L. — *banana*
Nyctanthes arbor-tristis Linn.
Odina wodier Roxb.
Oreodoxa regia — *Royal palm, Bottle palm*
Peltophorum ferrugineum Benth.
Phoenix sylvestris Roxb. — *Wild date palm*
Pisonia morindifolia R. Br. — *Tree Lettuce*
Pithecolobium dulce Benth.
Plumeria acutifolia Poir. — *Pagoda tree*

P. alba Linn.
Polyalthia longifolia H. K. f.
Pongamia glabra Vent. — *Indian beach* — (*P. pinnata* Merr.)
Premna latifolia Roxb. Var. *mollissima* Cl.
Pritchardia sp.
Punica granatum Linn. — *Pomegranate*
Psidium guajava Linn. — *guava*
Ravenala madagascarensis Sonn. — *Travellers' palm*
Santalum album Linn. — *Sandal wood*
Sapindus emarginatus Vahl. — *Soapnut*
Stenolobium stans D. Don
Swietenia mahagoni Linn. — *Mahogany*
Syzigium jambolanum DC — *Java plum*
Tamarindus indica Linn. — *Tamarind*
Tectona grandis Linn. f. — *Teak*
Terminalia catappa Linn. — *Indian almond*
Thespesia populnea Cav. — *Indian tulip, Portia tree*
Thevetia neriifolia Juss — (*T. peruviana* Merr.)
Wrightia tinctoria R. Br.

ORNAMENTAL SHRUBS

Caesalpinia pulcherrima Sw. — *Peacocks flower*
Canna indica L. — *Indian shot*
Cestrum nocturnum — *Queen of the night*
Ervatonia coronaria Stapf.
Hibiscus rosa-sinensis Linn. — *Shoe flower*
H. schizopetalus Hook.
Ixora coccinea Linn.
Jasminum sambac Ait. — *Jasmine*
J. grandiflorum Linn.
Mirabilis jalapa Linn. — *Marvel of Peru*
Nerium odorum Soland — *Oleander* — (*N. indicum* Mill.)
Nyctanthes arbor-tristis Linn.

CLIMBERS

Abrus precatorius Linn.
Antigonon leptopus Hk & A
Beaumontia grandiflora Wall
Bougainvillea spectabilis Willd
Echites paniculata Roxb — *Malathi*
Hiptage madablata Gaertn — *Madhivilatha*
Ipomoea sp.
Pentatropis microphylla W & A. — *wild*
Porana paniculata Roxb. — *Bridal creeper*
Pothos scandens Linn.

Quisqualis indica Linn. — *Rangoon creeper*
 Telosma minor Craib.
 Tinospora cordifolia Miers. — *Willd*

PALMS

Areca catechu Linn. — *Arecanut palm*
 Borassus flabellifer L. — *Palmyra palm*
 Caryota urens Linn. — *Malabar sago, Kittul palm*
 Cocos nucifera L. — *Coconut palm*
 Kentia sanderiana Hort.
 Livistonia R. Br.
 Oreodoxa regia H. B. K. — *Royal Palm*
 Phoenix sylvestris Roxb. — *Wild date*
 Pritchardia Seen & H. wendl.
 Raphis flabelliformis Beauv.
 Thrinax Linn.

FRUIT TREES

Achras sapota Linn. — *Sapota*
 Anona squamosa Linn. — *Custard apple*
 Artocarpus heterophyllus Linn. — *Jack* — (*A. integra* Thumb.)
 Averrhoa bilimbi Linn.
 A. carambola Linn.
 Carica papaya Linn. — *Papaw*
 Citrus sinensis Pers. — *Orange*
 C. grandis L. — *Pumelo*
 Feronia elephantum Corr. — *Wood apple*
 Mangifera indica L. — *Mango*
 Musa sapientum Linn., *Banana*
 Persea gratissima Gaertn. — *Avacado pear*
 Psidium guajava Linn. — *Guava*
 Punica granatum Linn. — *Pomegranate*
 Syzigium jambolanum DC. — *Jamboo, Java Plum*

WATER PLANTS

Azolla — *Water fern*
 Ceratophyllum demersum Linn. — *hornwort*
 Chara sp. — *stonewort*
 Eichhornia crassipes Solms. *Water hyacinth*
 Hydrilla verticillata Royle.
 Lemna polyrrhiza Linn. — *Duck weed*
 Nelumbium speciosum Willd. — *Lotus*
 Nymphaea pubescens Willd — *Lily (Water)*
 Trapa bispinosa Roxb. — *Bullnut, Water Chestnut, singada nut*
 Victoria regia Lindl.
 Wolffia arrhiza Wimm.

WEED FLORA

Abutilon crispum G. Don.
 A. indicum G. Don.
 Acalypha lanceolata Willd.
 Achyranthes aspera Linn.
 Aerva lanata Juss.
 Allmania nodiflora R. Br.
 A. nodiflora R. Br., var. procumbens Hk. f.
 A. nodiflora R. Br., var. dichotoma Hk. f.
 Alysicarpus monilifer DC.
 Blainvillea rhomboidea Cass.
 Borreria hispida K. Sch.
 Bulbostylis barbata Kunth.
 Calotropis gigantea R. Br.
 Cassia absus Linn.
 Cissus vitiginea Linn.
 Cleome aspera Koen.
 C. viscosa Linn.
 Commelina bengalensis Linn.
 Corechorus acutangulus Lam.
 C. tridens Linn.
 Crotalaria linifolia L. f.
 C. verrucosa Linn.
 Cyperus rotundus Linn.
 Datura metel Linn.
 Desmodium gangeticum DC.
 D. triflorum DC.
 Evolvulus alsinoides Linn.
 Eleiotis sororia DC.
 Euphorbia hirta Linn.
 E. corrigioloides Boiss.
 Gisekia pharnaceoides Linn.
 Gomphrena celosioides Mart.
 Gynandropsis pentaphylla DC. — (*G. gynandra* Merr.)
 Hibiscus micranthus Linn. f.
 Heliotropium indicum Linn.
 H. curassavicum Linn.
 Hyptis suaveolens Poit.
 Indigofera glabra Linn.
 I. enneaphylla Linn.
 I. hirsuta Linn.
 Jatropha gossypifolia Linn.
 Justicia procumbens Linn.
 Lagasca mollis Cav.
 Lantana camera Linn.
 Leptadenia reticulata W & A.

Leucas diffusa Benth.
Lochnera rosea Reichb.
Malvastrum coromandelianum Garcke.
Merremia tridentata Hall. f.
Mollugo cerviana Ser.
M. disticha Ser.
M. nudicaulis Lamk.
Ocimum canum Sims.
Oldenlandia stricta Linn.
O. umbellata Linn.
Pavonia zeylanica Cav.
Pedaliu murex Linn.
Pentatropis microphylla W & A.
Phaseolus semierectus Linn.
P. trilobus Ait.
Phyllanthus maderaspatensis Linn.
P. niruri Linn.
Polycarpaea corymbosa Lam.
Rauvolfia canescens Linn.
Rhynchosia aurea DC.
Sesamum prostratum Retz.
Sida cordifolia Linn.
S. schimperiana Hochst.
Solanum nigrum Linn.
S. trilobatum Linn.
Stachytarpheta indica Vahl.
Tephrosia purpurea Pers.
Trianthema triquetra Rottl.
T. decandra Linn.
T. portulacastrum Linn.
Tribulus terrestris Linn.
Tridax procumbens Linn.
Vernonia cinerea Less.
Waltheria indica Linn.

SYSTEMATICS

(According to the flora of the Madras Presidency)

by J. S. GAMBLE

Annonaceae:

Annona squamosa Linn.
Polalthia longifolia Hook. f.

Menispermaceae:

Tinospora cordifolia Miers.

Nymphaeaceae:

Nymphaea pubescens Willd.
N. stellata Willd.

N. zanzibariensis

Nelumbium speciosum Willd.
Victoria regia Lindl.

Capparidaceae:

Cleome viscosa Linn.
C. aspera Koen.
Crataeva religiosa Forsk.

Violaceae:

Ionidium suffruticosum Ging.

Guttiferae:

Calophyllum inophyllum Linn.

Malvaceae:

Malvastrum coromandelianum Garcke

Sida cordifolia Linn.
S. schimperiana Hochst.
Abutilon indicum G. Don.
A. crispum G. Don.
Pavonia zeylanica Cav.
Hibiscus micranthus Linn.
H. rosa-sinensis Linn.
H. schizopetalus Hook.
Thespesia populnea Cav.
Adansonia digitata Linn.

Bombacaceae:

Bombax malabaricum DC.
Ceiba pentandra Gaertn.

Sterculiaceae:

Sterculia foetida Linn.
Waltheria indica Linn.
Guazuma tomentosa Kunth.

Tiliaceae:

Corchorus acutangulus Lam.
C. tridens Linn.
Berria ammonilla Roxb.

Malpighiaceae:

Hiptage madablata Gaertn.

Zygophyllaceae:

Tribulus terrestris Linn.

Geraniaceae:

Averrhoa bilimbi Linn.
A. carambola Linn.

Rutaceae:

Murraya exotica Linn.
M. koenigii Spreng.
Feronia elephantum Corr.
Atalantia monophylla Corr.
Citrus sinensis Linn.
C. grandis L.

Meliaceae:

Azadirachta indica A. Juss.
Swietenia mahagoni Linn.

Vitaceae:

Cissus vitiginea Linn.

Sapindaceae:

Filicium decipiens Thw.
Sapindus emarginatus Wall.

Anacardiaceae:

Mangifera indica Linn.
Anacardium occidentale Linn.
Odina wotlier Roxb.

Moringaceae:

Moringa oleifera Lamk.

Leguminosae: (Papilionaceae)

Crotalaria linifolia Linn.
C. verrucosa Linn.
C. laburnifolia Linn.
Indigofera enneaphylla Linn.
I. glabra Linn.
I. tinctoria Linn.
I. hirsuta Linn.
Tephrosia purpurea Pers.
Eleiotis sororia DC.
Alysicarpus monilifer DC.
Desmodium biarticulatum Benth.
D. gangeticum DC.
Canavalia lineata DC.
Phaseolus semierectus Linn.
P. trilobus Air.
Rhynchosia aurea DC.
Pongamia glabra Vent.

Caesalpiniaceae:

Caesalpinia pulcherrima Sw.
C. coriaria Willd.
Delonix regia Raf.
Cassia marginata Roxb.
C. siamea Lamk.
C. glauca Lam., var. *suffruticosa* Prain
C. absus Linn.
Bauhinia krugii Urban
Tamarindus indica Linn.

Mimosoideae:

Adenanthera pavonina Linn.
Leucaena glauca Benth.
Acacia arabica Willd.
A. auriculiformis Buch-Ham.
Albizia lebbek Benth.
A. amara Boivin.
Pithecolobium dulce Benth.
Enterolobium saman Prain.
E. cyclocarpum Griseb.

Combretaceae:

Terminalia catappa Linn.
Quisqualis indica Linn.

Myrtaceae:

Syzigium jambolanum DC.
Eucalyptus citriodora Hook.
Couroupita guianensis Aubl.

Lecythidaceae:

Barringtonia acutangula Gaertn.

Lythraceae:

Lagerstroemia flos-reginae Retz.
Lawsonia inermis Linn.

Onagraceae:

Trapa bispinosa Roxb.

Turneraceae:

Turnera ulmifolia Linn.
T. ulmifolia Linn., var. *elegans* Urb.
T. ulmifolia Linn. var. *angustifolia* Willd.

Passifloraceae :

- Passiflora foetida* Linn.
P. leschenaultii DC.

Caricaceae :

- Carica papaya* Linn.

Aizoaceae :

- Trainthema portulacastrum* Linn.
T. triquetra Rottl.
T. decandra Linn.
Mollugo cerviana Ser.
M. disticha Ser.
M. nudicaulis Lam.
Gisekia pharnaceoides Linn.

Rubiaceae :

- Oldenlandia umbellata* Linn.
O. stricta Linn.
Mussaenda glabrata Hutch.
Ixora parviflora Wall.
Ixora coccinea Linn.
Pavetta indica Linn.
Morinda tinctoria Roxb.
Borreria hispida K. schum.

Compositae :

- Vernonia cinerea* Less.
Lagasca mollis Cav.
Blainvillea rhomboidea Cass.
Tridax procumbens Linn.
Launea pinnatifida Cass.

Campanulaceae :

- Sphenoclea zeylanica* Gaertn.

Sapotaceae :

- Achras sapota* Linn.
Bassia longifolia Linn.
Mimusops elengi Linn.

Ebenaceae :

- Diospyros* sp.

Oleaceae :

- Jasminum sambac* Ait.
J. grandiflorum Linn.
Nyctanthes arbortristis Linn.

Apocyanaceae :

- Allamanda cathartica* Linn.
Carissa spinarum Linn.
Thevetia nerifolia A. Juss.
Cerbera manghas Linn.
Rauvolfia canescens Linn.
Ervatamia coronaria Stapf.
Wrightia tinctoria R. Br.
Beaumontia grandiflora Wall.
Aganosma dichotoma K. Schum.
Plumeria alba Linn.
P. acutifolia Poir.
Nerium odorum Soland.

Asclepiadaceae :

- Calotropis gigantea* R. Br.
Pentstemonis microphylla W & A.
Pergularia extensa N. E. Br.

Telosma minor Craib.

Leptadenia reticulata W. & A.

Boraginaceae :

- Heliotropium curassavicum* Linn.
H. indicum Linn.
Cordia obliqua Willd.
Trichodesma indicum R. Br.
Cynoglossum furcatum Wall.

Convulaceae :

- Ipomoea pes-caprae* Sweet
Porana paniculata Roxb.
Evolvulus alsinoides Linn.
Merremia tridentata Hollier. f.

Solanaceae :

- Solanum nigrum* Linn.
S. trilobatum Linn.
Physalis minima Linn.
Datura metel Linn.
Cestrum nocturnum Linn.

Bignoniaceae :

- Kigelia pinnata* DC.
Millingtonia hortensis Linn. f.
Stenolobium stans D. Don.
Jacaranda mimosaeifolia D. Don.

Pedaliaceae :

- Pedaliium murex* Linn.
Sesamum prostratum Retz.

Acanthaceae :

- Ruellia prostrata* Poir.
R. tuberosa Linn.
Andrographis echinoides Nees.
Justicia prostrata Gamb.
Adhatoda vasica Nees.

Verbenaceae :

- Lantana camera* Linn.
Stachytarpheta indica Vahl.
Tectona grandis Linn. f.
Premna latifolia Roxb. var. *mollissima* Cl.

Labiatae :

- Ocimum canum* Sims.
Hyptis suaveolens Poit.
Leucas diffusa Benth.
Leonotis nepetaefolia R. Br.

Nyctaginaceae :

- Pisonia morindifolia* R. Br.
Bougainvillea spectabilis Willd.
Boerhaavia repens Linn.
Mirabilis jalapa Linn.

Amaranthaceae :

- Allmania nodiflora* R. Br., var. *procumbens* HK. f.
A. nodiflora R. Br., var. *dichotoma* HK. f.
Pupalia orbiculata W.
Achyranthes aspera Linn.
Aerva lanata Juss.
A. monsoniae Mart.
Gomphrena celosioides Mart.

Polygonaceae :

- Antigonon leptopus* HK. f.

Euphorbiaceae :

- Euphorbia hirta* Linn.
E. corrigioloides Boiss.
Phyllanthus maderaspatensis Linn.
P. niruri Linn.
Phyllanthus emblica Linn.
Kirganelia reticulata Baill.
Breynia rhamnoides M. Arg.
Jatropha gossypifolia Linn.
Sebastiania chamaelea M. Arg.
Excoecaria agallocha Linn.
Hura crepitans Linn.

Moraceae :

- Ficus bengalensis* Linn.
F. religiosa Linn.
F. glomerata Roxb.
F. Krishnae
Artocarpus heterophyllus Lam.
A. incisa Linn.

Coniferae :

- Araucaria* sp.
Cupresses sp.
Thuja orientalis

Cycadaceae :

- Cycas* sp.

Hydrocharitaceae :

- Hydrilla verticillata* Royle.

Scitamineae :

- Canna indica* Linn.
Musa sapientum Linn.
Ravenala madagascarensis Son.

Liliaceae :

- Asparagus racemosus* Willd.

Pontederiaceae :

- Eichhornia crassipes* Solms.

Commelinaceae :

- Commolina bengalensis* Linn.

Palmaceae :

- Areca catechu* Linn.
Cocos nucifera Linn.
Phoenix sylvestris Roxb.
Caryota urens Roxb.
Borassus flabellifer Linn.
Oreodoxa regia
Livistonia chinensis
Pritchardia Seen & H. Wendl.
Thrinax Linn.
Raphis sp.

Araceae :

- Pothos scandens* Linn.

Lemnaceae :

- Lemna polyrrhiza* Linn.
Wolffia arrhiza Wimm.

Cyperaceae :

- Cyperus distans* L. f.
C. rotundus Linn.
Meriscus cyperinus Vahl.
Fimbristylis ferruginea Vahl.
Bulbostylis barbata Kunth.

Gramineae :

- Spinifex littoreus* Merr.
Saccharum spontaneum Linn.
Heteropogon contortus Beauv.
Manisuris myurus Linn.
Digitaria marginata Link.
Alloteropsis cimicina Stapf.
Eriochloa procera C. E. Hubb.
Brachiaria ramosa Stapf.
Paspalum scrobiculatum Linn.
Panicum repens Linn.
Aristida depressa Retz.
Trachys muricata Steud.
Tragus biflorus Schult.
Perotis indica O. Ktz.
Desmostachya bipinnata Stapf.
Eragrostis plumosa Link.
Cynodon dactylon Pers.
Chloris barbata Sw.
Dactyloctenium aegyptium Beauv.
Bambosa arundinacea Willd.

Acknowledgment: The author wishes to place on record an expression of his deep sense of gratitude to Prof. P. S. Jivanna Rao, M. A., for his help in the preparation of this article, besides leaving at author's disposal his notes on the flora of Adyar. The author is thankful to the President of the Theosophical Society for according permission to the author to visit the Adyar gardens frequently and publish the above account.

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Research Notes**Chilean Nitrate—A Nitrogenous Manure for Sugarcane**

The general practice of manuring sugarcane in this State is the application of a mixture of ammonium sulphate and groundnut cake, in the ratio 2:1.

Besides ammonium sulphate, Chilean nitrate is also a commercial nitrogenous manure. In order to test the efficacy of Chilean nitrate as a nitrogenous manure, as compared to the usual mixture of groundnut cake and ammonium sulphate, a bulk trial was laid at the sugarcane research station, Gudiyattam and conducted for a period of three years. Both the control and treated plots received the following basal dose.

1. Farm yard manure at 10 tons per acre.
2. Slaked lime at 1000 lb. per acre.
3. Superphosphate to supply 60 lb. P_2O_5 per acre.
4. Potassium sulphate to supply 60 lb. K_2O per acre.

The two treatments were.

1. Chilean nitrate to supply 200 lbs. Nitrogen per acre on N. basis.
2. Groundnut cake and ammonium sulphate in the proportion of 2:1 to supply 200 lb. nitrogen per acre on N. basis.

The quantity of different manures used per acre and the cost of the same are tabulated below :—

Control Plot			Treated Plot		
Quantity		Cost	Quantity		Cost
Basal dose:			Basal dose:		
Farm yard manure	10 tons	20—0—0	Farm yard manure	10 tons	20—0—0
Lime	1,000 lb.	18—12—0	Lime	1,000 lb.	18—12—0
Potassium sulphate	120 lb.	28—15—0	Potassium sulphate	120 lb.	28—15—0
Super phosphate	275 lb.	27—0—0	Super phosphate	275 lb.	27—0—0
Top-dressing:			Top-dressing:		
Ammonium sulphate	350 lb.	55—0—0	Chilean nitrate	1,140 lb.	285—0—0
Groundnut cake	2,050 lb.	172—5—0			
Total		322—0—0	Total		379—11—0

The yield and juice quality for the three years of trial are tabulated below :—

Treatments	Year	Yield in tons per acre	Population per acre	CCS%	CCS in tons per acre
1. Chilean Nitrate	1953	35.12	30,375	9.71	3.41
	1954	38.62	24,583	9.85	3.73
	1955	56.65	26,175	12.31	6.97
	Average	43.46	27,044	10.56	4.70
2. Control	1953	32.28	32,500	10.71	3.46
	1954	30.21	24,283	10.06	3.04
	1955	50.29	32,612	13.03	6.55
	Average	37.59	29,798	11.27	4.35

It is seen that Chilean nitrate has yielded better than the control i.e. an increase in yield of 5.87 tons per acre.

The total cost of manure with Chilean nitrate works out to Rs. 371—14—0 while the cost with groundnut cake and ammonium sulphate works out to Rs. 322—6—0 resulting in an increased cost in manure of Rs. 49—14—0 or Rs. 50/- per acre. But an additional yield of nearly 6 tons costing about Rs. 240/- is obtained leaving a margin of profit of Rs. 190/.

The above article is based on the results obtained from observational trials. The results are to be confirmed by conducting further trials on well laid out experimental plots.

Acknowledgment: This trial was conducted at Sugarcane Research Station, Gudiyattam which is partly financed by the Indian Central Sugarcane Committee, New Delhi. My thanks are due to this Committee for utilising the data gathered for the preparation of this article.

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Carpellary variation in *Cucurbita moschata* Duch

Several workers have reported on floral abnormalities in Cucurbitaceae. Bose (1934) has recorded the occurrence of hermaphrodite flowers with half inferior ovaries and apocarpous fruits in *Cucurbita pepo* L. The above characters as well as the presence of naked ovules have been reported by Meenakshisundaram (1955) in *Cucurbita moschata* Duch.

The present note is meant to record the tetracarpellary condition of ovary in *Cucurbita moschata* Duch. While examining materials collected for the class, it was noticed that a female flower of the above species showed the presence of four bifid stigmatic branches (figure 1). On taking a transverse section of the gynoeceium, it was seen that the ovary exhibited a clear tetracarpellary nature, with normal parietal placentation. Serial hand sections of the ovary indicated the pronounced development of all the four carpels in the central region of the ovary, (figure 4) while the section passing through the lower region showed three well developed carpels and a rudimentary fourth carpel in which the development of the placentum and ovules was not carried to a completion (figure 2)

Lawrence (1955) has stated that carpels in Cucurbitaceae are primitively five, usually 3 or sometimes 4, but has not recorded the occurrence of 4 or 5 carpels in any particular species. The present observation of tetracarpellary condition not only confirms the view of Lawrence but also suggests that the normal tricarpellary nature of ovary in Cucurbitaceae may be due to a reduction of carpels during the process of evolution.

The author's thanks are due to Sri J. Sakharam Rao for help and guidance in the preparation of this note.

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10-6-1957.

G. TULSIDAS.

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PLATE I

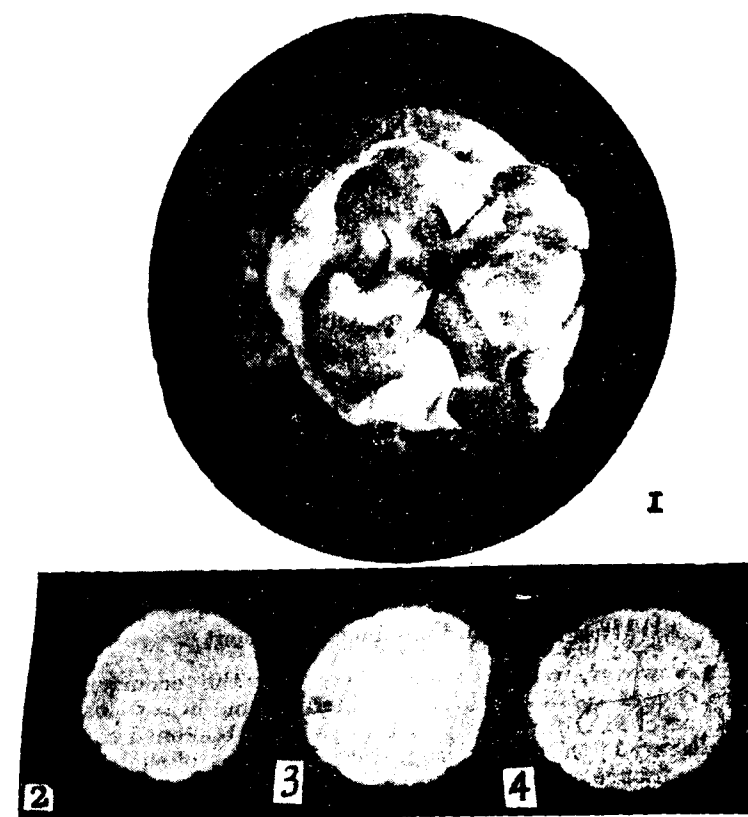


Fig. 1 Flower showing the four bifid stigmas (Calyx and corolla removed)

Serial transverse sections of the abnormal ovary through :-

Fig. 2 The region nearer the pedicel showing 3 well developed carpels and one rudimentary carpel.

Fig. 3 The middle region showing four carpels.

Fig. 4 The region nearer the style showing all the four carpels well developed.

A short note on *Paratetranychus Oryzae* Hirst -- The Paddy mite

Paddy, the staple food crop of the South, is subject to damage by numerous pests, most of which are hexapods with a few non-hexapods as well. The paddy mite comes under the latter category. The only available previous record about its occurrence in South India is by Cherian (1931 & 1938). The mites are in general minute creatures, somewhat globular in shape. The adults are provided with four pairs of legs, while the younger stages have only three pairs. They have a set of tearing and sucking mouth parts, with which they lacerate the plant tissue and suck up nutrition. The adults and young are invariably found in small groups under cover of a fine silken webbing. The pest has been recorded in isolated areas in Tanjore as well as in the extreme Northern and Southern districts like Chingleput, Madurai and Kanyakumari. It is found on a fairly virulent form during the months of July to January.

The pest occurs both in the nursery and in the transplanted crop and is generally found on the under surface of the leaves. The infested seedlings get pale in colour and are stunted in growth and invariably die off soon after transplanting. Damage to the transplanted crops is manifested by their poor conditions and by the development of sickly white patches on the upper surface of the leaves. In cases of severe incidence, the yield is reported to be reduced by about 25%.

It has, however, to be mentioned here that the occurrence of this pest is more or less sporadic. But considering the heavy loss inflicted on isolated patches, this mite has always to be reckoned as a potential and serious enemy of the paddy crop, since instances of such minor pests assuming prominence are not wanting.

Control: An effective control of this pest has always been a problem, since the eggs are resistant to most of the chemicals. Sulphur, either as dust or spray, is the time-honoured remedy, but its action is slow, as the lethal action is exerted only by the fumes, which will be evolved freely only under bright sunshine. Aramite (one lb. in 50 gallons of water), a new product has been found to have ovicidal action in addition to its being effective on young ones and adults and is a specific remedy which can be advocated only against the mite pests. Folidol (one oz in 25 gallons of water) can also be used with advantage as it not only controls this pest but other pests also.

Acknowledgment: My thanks are due to Sri M. Basheer, Government Entomologist for his suggestions in preparing this note.

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Bracon greeni Ashmead (Braconidae) as a Parasite of *Dactylethra candida* Meyr. (Gelechiidae)

In the course of his studies on the Coccidae of Ceylon, E. E. Green recorded a number of (Howard Ashmead, 1895) Hymenopterous parasites which were identified by Wm. H. Ashmead of the United States National Museum. One of them was *Bracon greeni* Ashmead. Though Green reported this species as a parasite of the lac insect *Tachardia albizziae*, Ashmead believed that it was in reality parasitic on a Tineid larva feeding on the coccid itself. Later literature contains references to three forms, *Microbracon lefroyi*, (D. & G.) *Microbracon greeni* Ash., and *Microbracon tachardiae* Cameron, all of which have been reported as biological agencies in the control of serious pests like *Erias fabia*, Stoll, and *Eublemmita amabilis* Moore. Ramakrishna Iyer (1928) has discussed the relationship of these forms and has concluded that the terms *Bracon* and *Microbracon* are synonymous and that *M. greeni*, *M. lefroyi*, and *M. tachardiae* are possibly synonyms. This view appears reasonable from a review of all the relevant literature.

Microbracon lefroyi has been studied by Lefroy (1906), Fletcher (1907), Lal (1917), Misra (1919), Ahmad and Gulamullah (1939, 1941), Haroon Khan and Verma (1945) from the standpoint of biology, ecology and pest-control. Glover and Gupta (1939) have studied *Bracon greeni* with profitable results in connection with the practicability of biological control in the lac industry.

In his recent studies on the gall fauna of *Tephrosia purpurea*, the author (Kalyanam, 1957) has reared *Bracon greeni* for the first time as ectophagous parasite from the caterpillars of *Dactylethra candida* which form stem galls on the plant. The parasites oviposit by piercing the thin walled top of the gall enclosing the grown up caterpillar. A single caterpillar is often attacked by more than one grub of the parasite. As many as nine grubs have been observed on a single host (Fig.). Before pupation, each grub secretes a thin walled yellowish case around itself. The adult pierces through this case at the time of eclosion. Among the large number of parasites reared, it has been found that males and females occur more or less in equal numbers, the males being considerably smaller than the females. The parasites are abundant under mild climatic conditions (October, November & December). The association of *Bracon greeni* with the stem galls on *Tephrosia purpurea* indicates the possibility of easily collecting this useful form to be released in the desired area.



Acknowledgments: The author is highly grateful to Dr. S. Krishnamoorthi, Professor and head of the Department of Agriculture, Annamalai University, for guidance and useful criticisms in the preparation of this account. The author's thanks are due to Prof. R. V. Seshaiya, Head of the Department of Zoology for providing valuable reference and laboratory facilities.

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News and Notes

STATE CONFERENCE OF AGRICULTURAL UPPER SUBORDINATES

The State Conference of Agricultural Upper Subordinates of Madras State was held at Coimbatore on 6th and 7th September 1957.

Sri M. V. Jayaraman, Secretary, in his welcome speech pleaded for the appointment of Agricultural Graduates as Block Development Officers as the Agricultural Graduates are the only persons with an adequate knowledge of such varied subjects as Animal Husbandry, Engineering, Dairying, Poultry - Farming, Bee-keeping, etc.

Sri S. N. Chandrasekharan, Retired Vice-Principal and Professor of Botany in his Presidential address said that it was paradoxical to see that the Agricultural Graduate who helped in the production of food was himself asking for food and asked whether it was a correct policy of Government to make Agricultural Graduates starve when they were expected to produce more food.

Sri N. Mahalingam, B. Sc., A. M. I. E. M. L. A., in his inaugural address admitted that the Agricultural Graduates deserved a much higher pay than what they were now receiving and added that they would have got a better pay had they pressed their claims earlier. He said that he was always of the opinion that there should be no disparity in pay between the Central and State Government servants doing comparable jobs in identical localities.

Sri V. Rajagopal, President of the Association, said that the work done in the Research Institute and elsewhere in the Madras Agricultural Department has gained international reputation but still the persons who were doing this work have been neglected.

Sri G. Tulsidas, Member of the Managing Committee argued that it was baseless to say that Agricultural Graduates were not practical farmers and asked whether all Engineers would be able to build a bridge across the Cauveri or whether all Medical Graduates would be able to perform complicated surgical operations. He said that with sufficient experience Agricultural Graduates become excellent practical farmers and that they are in no way inferior to Engineering, Veterinary and Medical Graduates either in their efficiency or in their importance in building a new India.

Sri Sivasubramaniam, Soil Conservation Assistant and Sri M. Vaidyanathan, Principal, Basic Training School, Kovilpatti also spoke. Sri T. S. Govindarajan, and Sri Kaleel Ahmed, Students, also spoke.

In his concluding speech Sri S. N. Chandrasekharan, requested Sri N. Mahalingam to plead for the cause of the Agricultural Graduates.

The Delegates' Session was held on 7th September with the President of the Association Sri V. Rajagopal in the chair.

Speaking on the resolution for revision of pay Sri G. Tulsidas said that the Engineering Graduate gets promoted as Assistant Engineer within a period of 5 years and the Veterinary Graduate gets extra remuneration by way of private practice. To compensate for these benefits enjoyed by other professional graduates, he pleaded for a scale of pay of Rs. 200—10—350 to the Agricultural Graduate and suggested a levy of 2 Rs. per ton of fertilisers to meet the extra expenditure to be incurred by Government in revising the pay of Agricultural Subordinates.

Speaking on the resolution for appointment of Agricultural Graduates as Block Development Officers, Sri M. V. Jayaraman cited the evaluation report on the working of Community Projects and said that there is no reason why Agricultural Graduates should not be appointed as Block Development Officers in all the Blocks.

A resolution requesting the abolition of language test for crossing the efficiency bar and for promotion was passed. Another resolution requested the Government not to substitute Personal Assistants to District Agricultural Officers by Junior Superintendents as the duties of Personal Assistants are not merely administrative but also technical in nature. In another resolution the Association requested Government to appoint one Seed Farm Officer (in the category of the District Agricultural Officer) for every 10 or 12 seed farms. Resolutions requesting Government to sanction a fixed travelling allowance of Rs. 75/- per month to all Agricultural Demonstrators, to sanction an Upper Division Clerk to be in charge of the stock of each Agricultural Depot, and to increase the number of permanent posts both in the Gazetted and Non-Gazetted cadre were also passed.

Several delegates from all over the State attended the Conference.

Weather Review — For September, 1957

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January 1957
North	Madras (Meenambakkam)	5.0	+ 0.3	19.9
	Tirurkuppam*	4.1	- 2.3	19.8
	Vellore	3.3	- 3.6	18.1
	Gudiyatham*	5.4	+ 1.8	23.9
East Coast	Palur*	4.9	- 0.7	14.4
	Tindivanam*	2.2	- 2.5	18.5
	Cuddalore	3.1	- 2.1	14.9
	Nagapattinam	4.2	+ 0.9	15.7
	Aduthurai*	10.7	+ 6.3	23.4
	Pattukottai*	5.5	+ 2.0	14.4
Central	Salem	2.6	- 3.5	15.3
	Coimbatore (A. M. O.)*	0.2	- 1.0	8.6
	Coimbatore	0.1	- 1.5	6.9
	Tiruchirapalli	3.6	- 0.4	10.5
South	Madurai	7.9	+ 3.2	15.8
	Pamban	1.3	+ 0.2	4.7
	Koilkatti*	2.0	+ 0.8	8.9
	Palayamcottai	0.4	- 0.8	9.6
	Ambasamudram*	Nil	- 1.4	6.1
	Nagarcoil	Nil	- 2.0	29.2
Hills	Kodaikanal	4.1	- 3.2	31.5
	Coonoor*	1.9	- 1.8	36.0
	Ootacamund*	1.0	- 3.0	44.0
	Nanjanad*	1.8	- 3.6	44.3

Note:— 1. * Meteorological Stations of the Madras Agricultural Department.

The month commenced with a dry weather practically throughout the State which lasted till 5th September, 1957, due to monsoon being weak over Kerala and Coastal Mysore. As a result of the movement of a feeble trough of low pressure from the West Central Bay of Bengal towards the coastal Andhra Pradesh, rain or thundershowers were scattered in Madras state on 6th September, 1957. Due to the strengthening of the monsoon in the South Bay of Bengal, rains or thundershowers were fairly widespread in Tamil Nad on 7th September, 1957, localised on 8th September, 1957, and scattered on 9th September, 1957. The effect of depression formed in the West Central Bay of Bengal on 10th September, 1957 was felt as a few showers in Tamil Nad on that day. Owing to the crossing of the depression over the coastal Andhra Pradesh on 11th September, 1957, scattered rains or thundershowers were received in Madras State. For two days from 12th September, 1957, the State experienced mainly a dry weather. After a day of wet spell on 14th September, 1957, the weather was again practically dry in Madras State on 15th September, 1957. In this period, there were fluctuations in the night temperatures, which generally remained above normal.

On 16th September, 1957, the South-west monsoon was withdrawing from northwest India, Uttar Pradesh, the Central parts of the country and the Bombay State, and conditions were favourable for the onset of the North-East monsoon

rains over the east coast of the Peninsula. As a result, localised rains or thunder-showers were received in Tamil Nad for three days from 16th September, 1957. For two days from 19th September, 1957, rains or thundershowers were fairly widespread in South Tamil Nad and the weather remained mainly dry in north Madras. On 21st September, 1957 and 22nd September, 1957 rains or thundershowers occurred at a few places in Madras State. For four days from 23rd September, 1957, dry weather prevailed in the State and night temperatures remained unsteady. A trough of low pressure, developed on the previous day in East Arabian Sea, was lying on Malabar-Kanara Coast on 26th September, 1957, as a result of which rains or thundershowers were scattered in Madras State on 27th September, 1957 and 28th September, 1957, and localised on the last two days of the month.

The day temperatures were above normal during the dry days of the month. The fluctuation of day temperatures was marked throughout the month under report.

Rainfall: The noteworthy rainfalls and the Zonal rainfall for the month are furnished below:

Noteworthy Rainfalls for the month.

S. No.	Date	Name of Place	Rainfall in inches
1.	7-9-57	Tiruchirapalli	1.71
2.	10-9-57	Nagapattinam	1.88
3.	19-9-57	Pattukottai	2.21
4.	30-9-57	Madurai	2.80

Zonal Rainfall for the month (in inches)

Name of Zone	Rainfall for the month	Departure from Normal	Remarks
North	4.5	- 1.0	Below normal
East Coast	5.1	+ 0.7	Above normal
Central	1.6	- 1.6	Far below normal
South	1.9	Nil	Just normal
Hills	2.2	- 3.2	Far Below normal

Agricultural Meteorology Section,
Lawley Road P. O.
Coimbatore, 10-10-57

C. B. M., M. V. J., & M. S. D.

Departmental Notifications

Gazetted officers — Madras Agricultural Service

Name and Designation	Transferred and Posted
Sri M. Kandaswami, Crop & Plant Protection Officer (Mycology) Coimbatore.	As Lecturer in Mycology Agri. College & Research Institute Coimbatore Vice. Sri C. V. Govindaswamy.
„ N. Ramesh Adyanthiah, Assistant in Mycology, Coimbatore.	Reappointed as Asst. Mycologist and posted as Crop and Plant Protection Officer (Mycology) Coimbatore Vice. Sri. M Kandaswami.
„ T. D. Muthuswami, Cane Development Officer, Nellikuppam.	To act as Assistant Agronomist (Sugarcane) Zonal Farm Pandiarajapuram, Madurai District.
„ S. Mahadeva Ayyar, Block Development Officer, Gobichetty-palayam, Coimbatore District.	Appointed to act temporarily as D. A. O., Tirunelvely.
„ S. Ramachandran, Special Agricultural Demonstrator (Sugarcane) Gudiatnam, N. Arcot District.	Appointed to act as D. A. O., Salem in the New Post sanctioned.
„ C. S. Sankaranarayana Ayyar, Farm Manager, Central Farm, Coimbatore.	Appointed to act as D. A. O., Sattur in the existing vacancy.
„ V. Nataraja Iyer, Dairy Manager, A. C. R. I., Coimbatore.	Appointed to act as D. A. O., Coimbatore in the Post sanctioned.
„ M. Kalimuthu, Teaching Asst. (On leave) Madurai.	Temporarily appointed D. A. O. Mayauram Vice Sri T. S. Balasubramaniam.
„ S. Kolandavelu Naicker, Block Development Officer, Musiri, Trichy.	Temporarily appointed to act as D. A. O., Ramanathapuram in the newly sanctioned post.
„ M. Damodara Prabhu, Teaching Assistant, A. C. R. I., Coimbatore.	Temporarily to act as Lecturer in Agri. Vice. Sri. Subramania Sarma, posted as D. D. Coimbatore.
„ S. Muthuswami, Formerly D. A. O. (Gramadhan Work) on the abolition of the post.	Posted as D. A. O., Madurai, Vice. Sri. K. C. Thomas.
„ K. Santhanam, Principal, Rural Extension Training Centre, Bhavanisagar.	Posted as D. A. O., Trichy in the Post.

Postings and Transfers

Upper Subordinates — Agricultural Department.

Name and Designation	Transferred or posted to
Sri A. R. Krishnamurthi, Personal Assistant, to the D. A. O., Trichy.	Posted as Sugarcane Assistant, Gudiatnam Vice. Sri. C. R. Thiruvengadam promoted to M. A. S.
„ V. Srinivasan, Personal Assistant to D. A. O., Sattur.	Posted as Farm Manager, State Seed Farm, Veerapandipudur.
„ M. Sethuraman, Personal Assistant to D. A. O., Salem.	Asst. Lecturer in Agriculture, Coimbatore, Vice Sri. Navaneethakrishnan deputed to Government of India.
„ K. M. Balasubramaniam, Assistant in Paddy, Palur.	Posted as Paddy Assistant, Aduthurai.
„ R. Appadhurai, Millet Assistant Coimbatore.	Posted as Millet Assistant, Koilpatti, Vice Sri. S. Sankaran.
„ S. R. Sreerangaswami, Paddy Assistant, Coimbatore.	Posted as Assistant Lecturer in Botany Coimbatore.
„ S. Sankaran, Millet Assistant Koilpatti.	Chillies Assistant Koilpatti, Vice Sri. T. B. Krishnaswami Rao promoted to M. A. S.
„ K. Nagappan, A. D., Uthukuli.	Posted as Oilseeds Development Assistant Madras, Vice Sri. C. Kumaraswami.
„ S. T. Srinivasan, Paddy Assistant Ambasamudram.	Posted as Farm Manager State Seed Farm, Sivakasi, Vice Sri. S. Srinivasan.
„ I. Ghanavaram, Soil Conservation Assistant, Dharapuram.	Posted as Soil Conservation Assistant Kannivadi Scheme (Existing vacancy)
„ S. V. Hariharan, Soil Conservation Assistant, Vellore.	Posted as Soil Conservation Assistant Tiruvellore (New Post)
„ G. Ramanathan, Soil Conservation Assistant, Vellore.	Posted as Soil Conservation Assistant Kodaivasal (New Post)
„ Arumugam, Agri. Extension Officer, Tiruparankundaram (Under orders of transfer as Extension Officer, Gandhigram)	Posted as Agricultural Extension Officer, Madurai, Vice Sri. P. N. Sethuraman, applied for leave.

Emergency Appointment of Upper Subordinate.

Name and Designation	Posted
Sri S. Visvanathan B. Sc. (Chemistry)	Is appointed as Upper subordinate and Posted as Chemistry Asst. Sugarcane Res. Sub-Station, Trichy.
„ K. G. Ramachandran Unni	„ Sugarcane Asst. Gudiatnam vice Sri P. R. Ananda Rao Resigned.
„ Nazer Mohamed, B. Sc.	„ Posted as Millet Asst, Coimbatore vice Sri R. Appathurai transferred.
„ M. S. Rajagopal, B. Sc. (Hons)	„ as Entomology Asst., Coimbatore
„ K. N. Balakrishna Pillai, B. Sc., (Ag.)	„ as Coconut Nursery Asst. Nagarcoil.
Srimathi Janaki Krishnan, B. Sc.,	„ as Paddy Asst. Coimbatore Vice Sri G. Purushothaman.
Sri V. Krishnamurthy, B. Sc., D. I. H.	„ Second Cane Asst. Vadapathimangalam, Tanjore Dist.
„ T. Balachandran, B. Sc.	„ as Entomology Asst. Coimbatore vice K. K. Sukumaran transferred.
„ A. M. R. Ramanathan, B. Sc.	„ as Chemistry Assistant.
„ V. Rathanasabapathy, B. Sc. (Chemistry)	„ as Chemistry Asst. Coimbatore.
„ R. Madhav, B. Sc.	do
„ B. Dhandapani, B. Sc., (Chemistry)	„ do
„ P. R. Jayaraman, B. Sc. (Chemistry)	„ do

True Copy of G. O. Ms. No. 3205, dated 16-10-1957
Food and Agriculture Department.

ORDER

The Secretary of the Association of Upper Subordinates in the Agriculture Department communicated to the Government through the Director of Agriculture four resolutions passed at the general body meeting of the Association held at Coimbatore on 15-6-1956. While forwarding the representation to the Government the Director of Agriculture offered his remarks seriatim on the resolutions. The resolutions have been examined in the light of the remarks of the Director of Agriculture.

2. The first resolution pleads for the upgrading of the pay scale of the Upper Subordinates in the Agriculture Department on a par with that prevailing in the Animal Husbandry Department or to Rs. 200-10-350/- per mensem. The matter is receiving the attention of the Government.

3. The request in the second resolution is that the formation of Branch Associations of Upper Subordinates in the districts and taluks should be permitted. The Government have no objection to the Association forming branch Associations in the districts and taluks. But the resolutions passed by the Central Association alone will be considered by the Government and the resolutions passed by the branch Associations will not be taken into consideration even though they are communicated through the Central Association.

4. The third resolution suggests that all the Upper Subordinates working in the Districts may be deputed to attend the Annual College Day and Conference of the Agricultural College and Research Institute, Coimbatore. The Government consider that it will be impracticable to depute all the Upper Subordinates to the Annual College Day and Conference. They however direct that one Upper Subordinate from each District be permitted to attend the Annual College Day and Conference of Agricultural College and Research Institute, Coimbatore.

5. The fourth resolution is about the relaxation of the qualification prescribing the possession of a degree by research or otherwise in the subject concerned in addition to the B. Sc. (Ag.) degree in respect of promotions to Gazetted teaching posts in the Agricultural College, Coimbatore. The Director of Agriculture has stated that this request will be examined as a separate issue. The Director of Agriculture is requested to submit his remarks on the resolution in question.



Review of the Market Conditions of Commercial Crops in the Areas of Market Committees for the Month of September, 1957.

Cotton : (In this Section: Cdy. = 784 lbs. Pothi = 280 lbs.)

Tiruppur: There was only a fall of 47 cents of rain at Tiruppur during the month under report. Sowings of cotton have been completed in garden lands, while the growers are awaiting rain for sowing of cotton in dry lands.

The market started with an opening balance of 6026 candies of Cambodia and 512 candies of Karunganni lint in Tiruppur. The total arrivals into Tiruppur were 3765 candies of Cambodia and 319 candies of Karunganni lint which included 1029 candies of Cambodia and 119 candies of Karunganni lint locally ginned. Total despatches from Tiruppur accounted for 4258 candies of Cambodia and 434 candies of Karunganni lint which included 1521 candies of lint sent, in all, to Mathurai, North Arcot, Tirunelveli, Tiruchirapalli, South Arcot districts and Madras of Madras State and Kerala State and Salimar. There was a closing stock of 5535 candies of Cambodia and 397 candies of Karunganni lint.

The Kapas market started with an opening balance of 9849 pothis of Cambodia and 549 pothis of Karunganni. Arrivals during the month accounted for 12458 pothis of Cambodia and 1013 pothis of Karunganni kapas. Disposals amounted to 17970 pothis of Cambodia and 913 pothis of Karunganni kapas leaving a closing stock of 4337 pothis of Cambodia and 649 pothis of Karunganni kapas.

The cotton market continued to be steady during the month under report. The price ranges were as follows:

<i>Lint (per candy of 784 lbs).</i>	
Cambodia superior quality	Rs. 830 — 850.
Cambodia average quality	Rs. 781 — 825.
Karunganni superior quality	Rs. 820.
Karunganni average quality	No transaction.

Kapas (per pothi of 280 lbs).

Cambodia superior quality	Rs. 130 — 137.
Cambodia average quality	Rs. 110 — 127/75.
Karunganni superior quality	Rs. 116/25 — 122/50.
Karunganni average quality	Rs. 100 — 112.

Ramanathapuram Market: During the month under report good rains were received throughout the district. The Karunganni cotton sowings have commenced in Sattur, Srivilliputhur and Aruppukottai taluks extensively and about 60% of the area is expected to have completed sowings, by this time. The Uganda pickings continued during the month and it is expected to be completed during the coming month.

The three markets of Sattur, Rajapalayam and Virudhunagar together opened with a stocks of 6950 pothis of Kapas and 945 candies of lint. The arrivals and disposals amounted to 12800 pothis of kapas 2185 candies of lint and 15650 pothis of Kapas and 1330 candies of lint respectively. The closing stock of kapas and lint were placed at 4100 pothis of kapas and 1800 candies of lint.

The following were the closing prices of Kapas and lint which ruled in these markets are detailed below :

Kapas (280 lb. per pothi) :

Karunganni	Rs. 105 — 110.
Tinny Karunganni	„ 100 — 104.
2nd Crop of Karunganni	„ 90 — 96.
Tinny	„ 70 — 80.
Uganda 1st quality	„ 125 — 130.
Uganda 2nd quality	„ 112 — 123.
Uganda 3rd quality	„ 100 — 108.

Lint (784 lb. per candy) :

Karunganni	Rs. 840 — 880.
Tinny Karunganni	„ 820 — 840.
Tinny	„ 776 — 780.
Certified Uganda	„ 1086.
Uncertified Uganda	„ 1030 — 1050.

South Arcot District: 506 pothis were received in two markets Villupuram and Panrutti and 484 pothis were despatched to Tirupur. A stock of 51 pothis was left with the trade at the end of the month.

Prices were on the increase and average prices ranged from Rs. 101/10 to 107/50 per pothi.

Groundnut: *South Arcot Markets:* Receipts at the markets totalled 4150 tons comprising 6032 tons from the district production and 118 tons from Tiruchirapalli and North Arcot districts. Crushing in Mills and

Chekkus amounted to 3997 tons and 287 tons respectively. Despatches to Coimbatore, Madras, Salem, Tiruchirapalli and Tanjore districts came to 2786 tons while exports to Pondicherry State totalled 8 tons. Wastages were calculated at 407 tons. The stock balance with the trade at the end of the month stood at 1276 tons.

Prices were on the increase due to decreased arrivals and the average prices ranged from Rs. 151—161.50 per candy of 531 lb. according to quality in the several markets.

North Arcot District: Heavy to moderate showers were received in all the places of the district. The standing winter groundnut crop is fair and its yield expected to be normal. The season is expected to commence by the end of October.

The regulated markets at Vellore, Arcot and Tiruvannamalai attracted some arrivals. The Government have recently notified the ban on transactions of groundnut within a radius of 5 miles around all the regulated markets of this Committee. As such, arrivals to the regulated markets during the coming season is expected to be very heavy.

The following was the stock position of groundnuts in the markets :

Kind of Commercial Crop	Opening Balance	Arrivals	Disposals	Closing Balance
Groundnut Kernels	151	405.86	435.86	121
Groundnut pods	167	73	116	124

Oil found a ready market at Madras. Hence prices for kernels and oil spurted up. Kernels were sold at Rs. 150—167 per candy of 531 lb., while oil at Rs. 300—322 per candy of 500 lb. Groundnut pods were quoted at Rs. 15 to 17 per bag of 80 lb., while oil cake at Rs. 8—9/25 per standard maund. For the same period during the last year kernels were sold at Rs. 143; oil at Rs. 300/- and oil cake at Rs. 8/25 to 8/67.

Ramanathapuram District: The groundnut market was moderately active and brisk during the month with fairly satisfactory transactions at appreciable rates.

The Virudhunagar market opened with a stock of about 1000 candies of kernels. Arrivals and disposals amounted to 1900 candies and 1920 candies respectively. The closing stock of kernels at the close of the month was only 980 candies.

The closing prices of groundnut kernels were quoted at Rs. 175—180 per candy of 53 lb. that of oil Rs. 23 of 35 lb. and that of oil cake at Rs. 9/66 to 10/66 per standard maund.

Gingelly: (In this section 1 bag = 168 lb).

South Arcot District: As harvest of the crop was in full swing in Virudhachalam taluk, arrivals at Virudhachalam increased and amounted to 3988 bags while arrivals from Tiruchirapalli district amounted 637 bags. Arrivals to six other markets totalled 30 bags in all. Consumption by pinto chekkus and country chekkus amounted to 8 and 1632 bags respectively. Despatches to Coimbatore, Tiruchirapalli and Tirunelveli districts came to 2165 bags. The stock at the end of the month with the trade stood at 1233 bags.

Prices were on the decrease, due to increased arrivals and the average prices in the several markets ranged from Rs. 64/10 to 70/05 per bag according to quality.

Tobacco — Coimbatore: The tobacco market continued to be practically the same as last month. Raising of tobacco nurseries in Palladam taluk has been completed and it is in progress in Avanashi and Pollachi taluks.

The price ranges were as follows:

Variety	I Grade	II Grade	III Grade
<i>Suncured: Chewing Tobacco:</i>	Rs.	Rs.	Rs.
Meenampalayam	200—210	150—180	75—110
Other Markets	160—205	100—145	50—90
<i>Cheroot varieties:</i>			
(Grown in Erode & Bhavani taluks)	200—230	145—180	70—100
<i>Pit cured:</i>			
Chewing varieties (grown in Palladam & Sular Areas)	175—225	100—175	50—100

Review of Administrative Activities of Market Committees for September, 1957.

General: Except Coimbatore Market Committee all other Market Committees in the State are functioning under 6-A of the Madras Commercial Crops Markets Act under their revenue Heads of districts concerned. The impediments in the way of normal working of Tirunelveli Market Committee and Ramanathapuram Market Committee are pending clearance. The elected committee of North Arcot Market Committee has not yet been constituted.

Enforcement: The following are the progress of licensing by the Market Committees during the month under report.

	Section 5 (1)		Section 5 (3)		Weighmen	
	A	B	A	B	A	B
North Arcot Market Committee	239	1348	89	932	45	564
South Arcot Market Committee	179	1389	114	1473	111	1459
Coimbatore Market Committee	173	986	43	915	69	601
Ramanathapuram Market Committee	—	—	—	—	—	—
Tirunelveli Market Committee	—	—	—	—	—	—

A: During this month.

B: Upto the end of previous month.

Meetings: An ordinary meeting of the South Arcot Market Committee was held at Gingee on 30—9—57. Nine members attended the meeting. Thirty three subjects were disposed of at the meeting.

A meeting of the Coimbatore Market Committee was held on 28—9—57 at Pollachi. Twenty nine subjects were discussed and passed.

Quality analysis: No analysis was done during the month.

Quality competition: Nil.

Price Spread of Cotton in the Tirupur Area

by

Sri K. SRIRAMAN, B. SC. AG., M. SC.,
Secretary, The Coimbatore Market Committee, Tirupur

Tirupur in Coimbatore district is a very important assembling centre for cotton. Mainly Cambodia and Karunganni are the two varieties marketed in this place. There are 26 ginning factories at Tirupur and nearly 32 kapas commission merchants housed within the regulated market at Tirupur market the bulk of the arrivals. The sales through the Co-operative Sales Society and the regulated market of the Coimbatore Market Committee are negligible. Nearly 2 lakhs pothis of kapas (280 lbs a pothi) arrive annually in the Tirupur market. The busy marketing season is from March to June. Hardly within 30 miles from Tirupur is situated the Coimbatore town—the “Manchester of South India”—which bustles with industry, having 42 yarn and textile mills. Hence the cotton assembled in the Tirupur area gets ginned at Tirupur and finds a ready sale for consumption in the mills at Coimbatore. The conditions for cotton trade are thus ideal with the producing, processing and consuming centres being so nearly situated. A study of the expenses incurred in marketing the cotton and the share each sector obtains from out of the sale proceeds, in such an important cotton growing and consuming area should be of great interest to the student of economics. The details of such a study are presented herein.

The agriculturists themselves bring their cotton kapas to the assembling centre at Tirupur for sale through the commission merchants from whom they have already received loans for cultivation expenses or for household purposes. The merchants from Tirupur also send their representatives to the villages and purchase the cotton kapas at the farms. There are brokers in the villages, who aid the merchants of Tirupur, in making such purchases, by giving the information about the availability of the cotton, negotiating the price. After the price is fixed, the kapas is weighed in the villages itself, paying for the same. The bags of kapas called locally “malagu” are loaded into bullock carts or into lorries and transported to Tirupur. On an average, a distance of about 10 miles may be taken, for the conveyance of the kapas from the villages to Tirupur. At Tirupur, the malagus are unloaded from the vehicle and again weighed before stocking inside the godowns. So far as kapas is concerned, all the produce comes into the regulated market of the Coimbatore Market Committee where all the commission merchants have been provided with godowns on a rental basis. Hence all the kapas is stored and transacted inside the Tirupur regulated market only. It may be roughly computed that the cotton kapas gets sold during the season within 3 or 4 days. Within this period, there is a loss of about $\frac{1}{4}$ per cent

in weight because of dryage. The empty malagus for packing kapas when purchased cost about Re. 1—4—0 and on selling fetch only Re. 1—0—0 thereby involving a loss of Re. 0—4—0 per malagu for the use of the same.

The lint merchants or the ginning factory owners themselves purchase the cotton kapas and cart the same to the ginning factories. The merchants pay outright the prescribed ginning charges to the factory owner, which differ with the variety of cotton ginned. If the ginning factory owner himself purchases the kapas the charges involved in ginning are different. The outturn of lint to kapas varies with the variety, season and soil. As the cotton lint has to be transported to only a distance of about 30 miles to Coimbatore for consumption, the lint is not pressed but is packed loose in borahs (long stitched gunny sacks). The lint merchant takes samples of the lint and goes about from mill to mill, offering it for sale. Brokers are mostly used for effecting sales of lint to the yarn mills. When the lint is actually delivered at the mill, there is some further loss of about 1% in weight before the stuff is weighed and paid for. Thus the cotton moves on from the grower in the villages round about Tirupur to the commission merchant and the lint merchant, before finally it is purchased by the yarn mill at Coimbatore.

The expenses incurred at every stage of marketing and the portion of the consumer's rupee that it represents, is given below:—

A. Kapas Stage: (Per pothi of 250 lb. of Cambodia Kapas).

	Rs.	A.	P.	
Price paid to the agriculturist (Village site price)	100	0	0	94·3%
Brokerage and other expenses incurred in the villages	1	0	0	
Weighing charges at the village	0	4	0	
Loading the malagu into the cart at the village	0	2	0	
Carting charges (10 miles distance) from village to Tirupur	1	0	0	
Unloading and weighing charges at Tirupur	0	4	0	
Loss in the value of the empty malagu for using once	0	4	0	
Loss of $\frac{1}{4}$ % due to dryage	0	8	0	
Purchase price for the Tirupur Kapas merchant including expenses met, by purchasing at the place of production and bringing it to the assembling centre	103	6	0	

Note: If the agriculturist brings it himself and sells it through the commission merchants he has to incur the following expenditure.

0 4 0

Note: He has his own cart and does not spend on cartage.

0 8 0

Loss due to dryage

1 0 0

Food expenses at Tirupur

2 0 0

Commission charges

3 12 0

If the agriculturist sells it through the Co-operative Sales Society he has to incur all the above charges but the commission is Re. 1—12—0 instead of Rs. 2/- and so it works out to

3 8 0

If the agriculturist sells it through the regulated market at Tirupur he need not pay any commission charge or weighing charges and so the charges are.

1 12 0

The cotton lint merchant's purchase price of Kapas at Tirupur

106 0 0 100%

Note: (a) If the kapas merchant purchases in the village and sells it he gets no commission but gains

2 10 0

(b) If the agriculturist himself markets the produce to Tirupur and sells it through a commission mundy in addition to the village site price he gains

2 4 0 2.1%

(c) If the agriculturist markets the produce through the Co-operative Sales Society besides the village site price he gains

2 8 0 2.3%

(d) If the agriculturist markets his produce through the regulated market besides the village site price he gains

4 4 0 4%

B. Kapas — Lint Stage:

(Per candy of 784 lbs. lint).

Cart hire or lorry charges for transporting the kapas from the regulated market to the ginning factory — for 9 pothis

3 0 0

Note: The cotton kapas is ginned. In the case of Cambodia cotton nearly $8\frac{1}{2}$ to 9 pothis (280 lbs. pothi) of cotton kapas is required to obtain 1 candy (784 lbs.) of cotton lint and nearly $9\frac{1}{2}$ to 10 pothis are required in the case of Karunganni.

Picking good kapas — per 9 pothis to get a candy 10 0 0

Ginning charges per candy of 784 lbs. Cambodia lint 20 0 0

Note: In the case of Karunganni it is Rs. 2—8—0.

The labour for ginning, removing seeds and packing in borahs

1 6 0

Gin spare parts, oil and working expense

9 0 0

Total expenses

12 10 0

The ginning factory owner gets per candy a gain of

7 6 0

Note: No pressing charges are given, as most of the cotton is sent loosely packed.

If pressed, the charges are Rs. 20/- per candy of lint.

Note: For Karunganni lint, the charge is Rs. 21 -

If the ginning factory owner himself purchases and gins, he incurs an expenditure as below:

(Per edy. of 784 lbs.).

The unloading, weighing, stocking and loading charges for Cambodia

2 4 0

Carting charges or lorry charges from the ginning mill at Tirupur to the yarn mill at Coimbatore

4 8 0

to

6 0 0

Average

5 4 0

Brokerage and other incidental expenses at Coimbatore for selling the lint to the mills

5 3 0

Loss in processing at L₁

2 12 0

Total expenses per candy if the cotton merchant purchases the kapas and sells as lint

46 0 0

Cost price for the lint merchant or purchase price of kapas is Rs. 106×9 (pothis per candy)

954 -

Expenses incurred

46 -

Total 1000 -

Note: From 9 pothis of kapas, one candy of lint and 1725 lbs. of cotton seed are obtained in the case of Cambodia

The cost of cotton seed realised	172/-
The cost price for the lint merchant is	828 0 0
The selling price of the lint merchant or the purchase price of the yarn mill.	850 0 0

From the above narration and data, it is seen that the grower at the village gets 94.3% of the sale price of kapas at the assembling centre. If he markets his kapas himself at the Tirupur assembling centre (i) through a commission merchant, he realises 96.4%, (ii) through the Co-operative Sales Society, he gets 96.6% and (iii) through the regulated market, he realises the maximum of 98.3% of the sale price. It should be the objective of any regulation in trade, to afford conditions of marketing, which gives the agriculturist, the maximum share in the consumer's rupee and the establishment of the regulated market at Tirupur provides such a regulation. The Commission merchants still handle the bulk of the cotton kapas trade at Tirupur, because they advance loans to ryots which seems to be a necessity in this area.

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Edited and published by T. R. Narayanan, B. Sc. (Ag.), M. A. (Cantab.),
for the Madras Agricultural Students' Union and printed by A. Subramaniam,
at The Coimbatore Co-operative Printing Works, Ltd., Coimbatore.