Summary. Growing of fodder cholam in the black soil tract of the Tinnevelly District has been known to produce certain obvious changes in the physical condition of the soil which is probably the cause of the reduced yield of the cotton crop following cholam.

During the growth of the cereal crops of the tract, a rise in exchangeable soda as well as in clay content of the surface layers has been shown to take place, more in the case of cholam crop than in cumbu.

The probable cause of such rise and their relationship to the changes in the physical condition of the soil are discussed.

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FRUIT SUCKING MOTHS ON TOMATOES AND THEIR CONTROL

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Introduction. In July 1935, a crop of tomatoes was raised at the Insectary and it grew well for about 3 months in spite of occasional trouble from certain caterpillars. In October, however, with the advent of the fruits, large numbers of fruit sucking moths appeared and began to pay their attentions to the crop. Hiding by day under bushes and appearing on the scene under cover of darkness these destructive hordes of delicate creatures with pale green forewings and bright yellow hind wings became a menace to tomato culture. They pierced the fruits with their proboscis ; circular patches appeared at the place of feeding and rotting set in with the result that the fruits were utterly useless for human consumption. Taking advantage of the presence of these moths in large numbers detailed observations as to their habits were made and various remedial measures tried.

Life History and Habits of the Insect. Eggs are laid by the female moth on the leaves of a weed known as *Tinospora cordifolia* (சிந்தி கொடி.) The newly hatched cater-pillars feed on the tender

shoots and leaves of the plant. They grow in size and undergo a series of moults after which they spin together the leaves and line them with a fine texture of silk and then pupate. The life cycle of the moth from egg to adult is about a month, the egg, larval and pupal periods being 3, 18 and 9 days respectively. The caterpillars have an interesting habit of dropping down into the bushes when slightly disturbed which seems to be a method of protecting themselves from their enemies. A moth fed on jaggery water lived for 24 days but 12 days can be taken as an average life of the moth.

Two species of fruit moths (*Ophideres materna* and *O. fullonica*) of which the former predominated were noticed to visit the fruits. From a collection made in the field it was found that about 95% were *O. materna*.

As stated before, the moths hide during the day among the bushes and are active only after night fall. From 7 or 8 P. M. they commence their destructive activities and continue feeding till very late at night. A few of the moths have been noted to feed upto 4 A. M. Almost similar was the feeding habit of moths kept under captivity in the Insectary.

The moths show preference to ripe fruits but in their absence or when these become scarce they take to green or raw fruits also. The fruits on the top of the trellis are attacked first while the lower ones are taken up later. The fruits plucked and kept on the ground did not attract the moths at all.

A few observations were made on the power of flight of these moths. When the bushes adjoining the tomato plot were disturbed during day time a few moths were seen to rise in the air to about 200 feet and fly away in the direction of the wind and were lost sight of. When disturbed during night time also their quick flight was observed to some distance when they disappeared from view.

Fruits Affected by the Moth. The moths are known to feed in fairly large numbers on the fruits noted below:—

Names of fruits.	Places where the pest has been noted.
1. Batavian Oranges.	Samalkot, Pithapur (Godavary Dt.) Palacole, Nidadavole, Madumadinagudam (Krishna Dt.) Rajampet, (Cuddapah District) Panyam (Kurnool District.)
2. Kamala Oranges.	Palacole, Nidadavole, Madumadinagudem.
3. Oranges.	Kallar, Sethumadai, Semmedu, Agricultural College Estate.
4. Guavas.	Agricultural College Estate.
5. Grapes.	,, ,,
6. Tomatoes.	Agricultural College and Tudiyalur.
7. Bilimbi.	Kallar.
8. Cashew.	Kallar.
9 Mango.	Palacole, Nidadavole, Madumadinagudem.
10. Pomegranate.	,, ,, ,,
11. Cactus.	Agricultural College Estate.

Nature and Extent of Damage to Tomatoes by the Moth. The moths by means of their proboscis. puncture the fruits and feed on the sap. After feeding, the juice oozes out and the very next day after infestation the characteristic 'hollow' is seen and rotting sets in which extends during the next two or three days. The fruits become baggy and get shrivelled up. Unlike oranges the tomato fruit does not drop down to the ground as a result of the attack of the moth. If the moths attack the green fruits close to their stalk then some of them may drop. In nature, the same fruit may be punctured by more than one moth during different nights but one puncture is enough to spoil the fruit. Sometimes as many as five moths have been noticed feeding on a single fruit. On a modest estimate, at least 50% of the fruits were damaged during the season.

Trials of Remedial Measures. Several control experiments were conducted during the last season and a good deal of valuable information added.

Light traps: Bright mantle lights put up in the field to see whether moths had any attraction to lights gave negative results. Coloured lights such as blue, green, yellow and red had also no attraction for the moths.

Small traps: Ripe tomatoes cut open and smeared with molasses mixed with arsenate solution and Amyl acetate also did not attract the moths.

Poison baits: Plantains impregnated with a sugar solution of Sodium arsenate were hung by means of strings along with ripe tomato fruits. The baits were put out in the evening and removed in the morning. A few moths were noticed to feed on the bananas but no special preference to these fruits was noticed.

Experiments in the Laboratory showed that moths fed on poisoned bananas died within 12 to 36 hours after feeding. Other less costly fruits and those that can be got practically free will be tried during the next season.

Spraying of deterrents: Of all the deterrents tried, Crude oil emulsion was the best but even here the repellent action lasted only for three days and from the fourth day onwards the moths came in numbers to feed on the fruits. Spraying deterrents once in four days is not an economic proposition, especially in the case of tomatoes.

Destruction of adult moths: In the course of the experiments it was found that a bright light brought near the moths suddenly while feeding, stupefied them and made them unable to fly. This was taken advantage of and in this way hundreds of moths were captured and destroyed. As the crop does not grow high this method was very easy to practise. This, together with the eradication of the larval food plants *Tinospora* alone can be recommended against these fruit pests.

One other observation made during last year deserves mention in this connection. In the Central Farm Orchard where Batavian oranges and tomatoes were grown side by side, the moths showed distinct preference to tomatoes as against oranges. There was practically no attack on organges as long as the tomato crop was in the field but when this was pulled out in October the moths began to pay their attention to oranges. If these observations are confirmed by this year's studies we will have a cheap and effective remedy against this very serious pest of oranges in almost all fruit growing areas in this Presidency, i. e., growing tomato as a trap crop in such a way that the fruiting season may coincide with that of citrus so that the moths which are attracted to them may be captured and destroyed. We would request the district staff to give this a trial and let us know the results.

AN AFRICAN *RAGI*, ELEUSINE CORACANA GAERTN.—THE FINGER MILLET—WITH A VIOLET PURPLE COLOUR

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In a previous article (Rangaswami Ayyangar and Krishna Rao, 1931) three major types of purple pigmented plants have been described and their inheritance worked out. They are Purple, Dilute Purple and Localised Purple. In a subsequent article (Rangaswami Ayyangar, et al., 1933) a fourth type, Medium Purple was described. The mode of inheritance of all these types of Purple has been given. Factors P, I_1, I_2, H_1 and H_2 are involved in the above. The commonest type of Purple Pigmented Ragi is of the genetic constitution $P=I_1\ I_2\ H_1\ H_2$.

This article describes a fifth type of purple, viz., Violet Purple, and the mode of its inheritance. This Violet Purple was first met with in an African variety from Nyassaland. It was noticed that the plants had a tint of violet and were coloured deeper than the usual purple plants. Not being very vigorous, this purple was suspected to be a type of distress purple that would disappear with acclimatisation. Type plants were carried forward and it was noticed that even the next year the same tint of violet with the same un-economic growth existed. It was found that this type of purple manifested itself in all the places at which the normal purple manifests, with this difference that in the glumes the violet tinge added to the prominence of the purple. In the amount of purple this new type and the ordinary Indian type are about equal, only they differ in the quality of the same, which in the African type takes on a violet tinge so that the new type can fittingly be designated Violet Purple. The absence of this type of