

*Striga lutea* (*Theepalli*—Malayalam) parasitic on rice plant at the Agricultural Research Station, Pattambi can be briefly described as an erect, branching, stiff herb of the Natural Order *Scrophulariaceae* growing 6-15 inches high. Stem is slender, four-sided and hairy. Leaves are linear, very narrow, about half inch long, entire, sessile, arranged opposite below, and alternate opposite above. Flowers are many, white or yellowish, tubular with spreading limbs, epigynous, axillary and in the upper, either solitary or in lax bracteate spikes. Calyx is tubular and five-toothed. Tube is curved at the tip and the corolla four-lobed. Stamens are didynamous and epipetalous. Fruit is oblong, cylindric and one-fourth inch long.

#### Distribution of *Striga lutea* in Malabar with Special Reference to Walluvanad Taluq

*Striga* was known to be prevalent in a virulent form particularly in Ernad and Walluvanad taluqs, two out of the eight taluqs constituting the district of Malabar. A survey of this root parasite on rice was undertaken by the author in the *modan* areas of the Walluvanad taluq, wherein the Pattambi Agricultural Research Station is situated and the infestation was found to be universal though varying in intensity. In the Pattambi and Mannarghat firkas, two of the six firkas which go to make up this taluq, a fairly high degree of infestation was noticed. In very severe cases of attack the damage to the rice crop as judged by the eye on a comparison with the standing crop in the adjoining non-infested fields was estimated to be very considerable. In some of the firkas like the Mankada and the Sreekrishnapuram the introduction of this pest appears to be comparatively of recent times. It may be that *modan* cultivation in these areas was taken up only very lately. The existence even now in the surroundings of these *modan* lands of vast jungle areas fit for rice cultivation when cleared is in itself sufficient proof for this. The two firkas exhibiting the worst form of attack must have been the earliest to take the infection. It is generally noted that in a given area of *modan* cultivation, when *Striga* is detected in any odd corner, then necessarily the whole area is found infested. In a village, the rice cultivation is not, as a rule confined to a single consolidated area. Rice fields invariably are scattered in different localities separated from one another by garden lands, a barren hillock or a waste jungle. If *Striga* is noticed in any one field one could almost be sure that this could be traced, more or less, in all the other fields in that village. In the one case, the spreading of infection may mostly

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be by wind disseminating the seed while in the other, it may be through the contaminated rice seed imported from the infected area. Facilities for cheap and easy transportation of seed largely available in recent years in the interior of the villages must mainly be responsible for such wide distribution of this pest. One thing however noted, has a special significance. It is seen that infection of *Striga* is very little, practically nil, among rice fields in the northern taluqs of Malabar as compared with her southern taluqs. In fact, as one proceeds from the far South towards the northern portions of Malabar, there is a gradual diminution in the infection, the most severe infection being confined to the *modan* lands in the southern end of Malabar. Hence it is reasonable to suppose that the original home of infection in Malabar is in the south and that this has gradually spread northwards.

In places of low infection met with in the Walluvanad taluq there is a risk of the infestation assuming alarming proportions unless serious attempts are made to exterminate this pest. Of a total area of 183,022 acres reported to be under the wet, *palliyal* and the dry cultivation in this Taluq during the year 1935—36, 101,239 acres were under the dry cultivation alone. It therefore becomes clear that, should this pest have such an unrestrained spread, there is no doubt that it will be a serious menace to the *modan* rice cultivation. It is a common sight to observe in the midst of *modan* rice fields infested with the parasite several patches either with little or no plants surviving or with plants, sickly and poorly developed, contributing practically nothing to the yield. These patches when closely examined reveal dense colonies of *Striga*. The affected host plants present a blighted appearance, a phenomenon characteristic of what is implied by the vernacular name given to the parasite.

#### Observations on the Incidence and the Morphology of *Striga*

Several of the minute *striga* plants when they are first observed emerging from the soil are found to possess well-developed non-pigmented underground stems. Observations recorded at this station have shown that the maximum height of a single mature plant measures 18.5 inches and possesses 15 pairs of well defined leaves and 14 pairs of capsules. The average height to which the *Striga* grows in the *modan* land could be set at 8 inches. In a colony of *Striga*, what appears to be independent plants above surface are sometimes only branches arising from a single stock. In a single plant there



may be as many as 60 branches and there may be as many as 200 plants in a single square foot of area. The underground stem is sometimes three or more inches long. As a rule, the underground stem does not extend below a two-inch-depth of the soil.

The general flowering under field conditions at the Agricultural Research Station, Pattambi has been observed to commence from the middle of July. Up to 15 pairs of capsules have been counted for a single plant. A single capsule on an average formed 600 seeds though it has been stated (Tadulingam & Narayana, 1932) that there may be as many as 50,000 seeds produced by a single plant. The seeds are very minute, avoid and striated and are held in the innumerable flaps or folds provided in the free central placenta. A seed measures on an average  $313 \mu \times 187 \mu$ . The same authors have stated that the seed can remain viable for 40 years and more.

For a *Striga* plant emerging from the top layer of the soil, it takes about two months from appearance above ground to the bursting of the last capsule borne by it. The period of life above ground may therefore, within limits, get appreciably modified according to the depth to which the seed remains stationed in the soil. This probably accounts for the flowering in *Striga* noticed to take place sometime after a week from emergence and in several other cases even before. Pearson (1913) in his studies on the underground growth and development of *Striga* assigned about seven weeks for the sub-terranean growth period of a particular *Striga* plant under observation. It is thus evident that besides other factors like soil moisture, the main condition that influences the life period of the *Striga* above ground is the depth at which the seed remains deposited. This does not mean that it is only the seeds that remain in the first few inches of the soil layer that give rise to the plants. Experiments have shown that seeds even in the deeper layers of the soil can germinate and produce plants. In a pot-culture experiment conducted by the author during the year 1935 a *Striga* seed was noticed to germinate even at 6 inches depth from the top surface. The young plant, however, could not push through the mass of soil on the top and did not develop beyond a certain stage. This therefore lends support to the view that only seeds within the top layer of the soil generally germinate and grow into overground plants and that the innumerable seeds lying within the confine of the sub-soil, if they germinate, produce young plants that are but short-lived. Such plants though they may not make much progress have to make use of the host plant for their existence and this

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probably accounts for the sudden running down in condition of the rice plants in a *Striga* infected field though there may not be many *Striga* plants visible above the surface of the soil. For its metabolic activities the parasite *Striga* has to depend entirely upon its host when it is underground. When above ground, its dependence on the host is only partial as it makes its own plant food by photo-synthesis out of raw materials drawn from the host. Its development above ground, nevertheless, is mainly for its reproductive function.

### Summary and Conclusions

Very little literature on the parasitism of *Striga lutea* on rice is available. A brief account of the main cultural practices of rice cultivation in Malabar is given to show their relation to the incidence of *Striga*. The seriousness of the menace of *Striga* on *modan* rice in Malabar is emphasized. A brief description of the parasite as it appears in the rice fields in Malabar is given. The whole of the Walluvanad taluq in the Malabar District of Madras is infested with the parasite *S. lutea*. There are evidences to indicate that the original home of infection with *Striga* in Malabar is in the far South and that this has gradually spread North. The observed variation in the time of flowering among the *Striga* plants may be due to the varying terms of life period spent by them below ground. The sudden running down in condition of the rice plants, when the visible *Striga* plants are only few, may be due to the parasitism by underground *Striga*. When underground *Striga* behaves as a total parasite, while above ground, it conducts itself as a partial parasite, its growth activity then being mainly directed towards its reproductive functions.

### Reference :

1. Agri. Jour. India :- Vol. I: (1906) p. 169.
2. Mad. Agri. Stn. Reports-(1928-29) p. 551 and 1930-31, p. 479.
3. PALM, B.T. and Heuser, C., *Striga lutea* als Schadiger des Reis auf Sumatra, Zeitsch. f. Pflanzenkrankh, 34; 11-18.
4. PEARSON, H. H. W. The Problem of the witch weed-Dep. Agri. S. Africa, Bull. 40, (1913,) 3-34.
5. TADULINGAM C, and NARAYANA, G. V., A hand-book of some South Indian Weeds, (1932) 225-227.

