

CONTROL OF SANDAL SPIKE

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IN a recent report in this journal¹, it was announced that the application of antibiotics and a proprietary fungicide to spiked sandal plants induced reversion in them to the healthy state. It was also illustrated, where the leaves of one small end twiglet, marked suitably, appeared to be not characteristically spiked. The time involved in this transformation was stated to be about six months. Whether the effect would continue to be localised or distributed through the entire plant, time alone will show. The attempt is interesting as it follows the current trend in the chemotherapy of horticultural plants, particularly known to be virus infections on a previous nomenclature. In the sandal forest, in all these 75 years, not a single instance of a spiked plant having turned healthy had been seen or recorded, which possibly did not encourage such trials. One Frenchman by name Prioris attempted to cure spike but failed.

Previously several attempts were made to control the disease in sandal, through manurial treatments to encourage resistivity in the healthy plants but the results were negative. Root stimulants were tried by Sreenivasaya² in the hope of reactivating diseased roots to enhance resistance to spike infection. This was equally unsuccessful. He² turned his attention to the essentially parasitic habit of sandal as a remedy for this disease. In his view, only an association of sandal with *Cassia siamea* showed very limited infectivity to artificial infections, so that in the field it might prove a more useful host for the sandal to resist the infection. Plots were opened in spiked areas in several localities, culturing sandal with this species. But the disease did spread in spite of this treatment, belying the hope entertained therein. This was stated in a report on the parasitism of sandal³. There was no indication whether the sandal plants did haustorise this host at all. Sukhim Thisawat⁴ suggested some alternative methods of controlling spike in sandal. In one, he wanted sandal to be introduced from the Malayan region into India, hoping that the disease would not spread to it because there was no spike in that region. In a second one,

he wanted the Australian sandal, *F. spicatus* to be cultured here for the same reason. In Mysore itself the idea of bringing *S. yasi* and breeding resistant varieties by suitable methods between *S. album* (Indian sandal) and the exotic, was mooted but fortunately this was given up. But *S. yasi* is available here in Bangalore in the miniforest. The approach was unsound in that disease resistance only was the issue but not the heartwood formation, or the essential oil content of the hybrid, resulting therefrom. The Indian attempts were aimed mainly with an eye on the prize of Rs. 10,000 offered in 1903 by the Mysore Government for a simple and cheap remedy. Muthanna⁵ referred to this offer and bemoaned that no one had claimed it till 1955.

Kirkpatrick and Lindner⁶ were probably the earliest to try an antibiotic like Chloromycetin on TMV. There was no effect against tobacco. But in the case of TMV in tomato plants, there was a lowering of the TMV multiplication and also in the case of a few tree viruses on cucumber. Since then, such treatments had gained wide application. In the case of trees like sandal, the problem poses many difficulties.

In the earlier investigation on spike disease in sandal, curative methods did not gain currency because the number of trees to be cured in the forests were counted in thousands in the several forest divisions, within a decade of the discovery of spike! Only preventive measures were undertaken with a view to arrest the ravages of disease, since a diseased plant does not recover and dies finally in a matter of weeks or months. In the beginning, mechanically removing live and dead spiked plants was arranged for, which was incomplete, not being thorough at all. In a report by Coleman⁷, it was recorded that between 1903 and 1910, 7 lacs* of spiked trees were removed in Mysore District, and 1 lac* each in Coorg and Madras. It was recognised that this was incomplete and ineffective also, since spiked rootlets left in the soil produced spiked plants only. Mechanical extraction does

* 1 lac = 1,00,000.

not avoid this defect. At the present time, an enumeration of spiked plants had been going on for some years⁸ and the number recorded was very high indeed. Nearly three-quarter of the area in sandal in Mysore is under spike.

The spread of spike in the forests had assumed epidemic proportions in some years which adds to the complication. Still some areas are free from spike. Till the spiked plant dies, it multiplies the infective principle in its leaves and twigs, increasing its virulence as well. It is a source of infection to the area around it and also at some distance since skips of 40 miles and more have been previously recorded for spike. The most elementary treatment turned out to be to reduce the time and duration of such infection by chemical treatment to a few days or weeks tried in this case only. In this process the tree dies soon and with it the infection also is destroyed. This method of removing the source of infection or isolation as it is also referred to, is a well recognised technique in plant pathology. This item was specially considered at the Annual Conference held in the Indian Institute of Science, Bangalore, in 1931 and reported also in foreign periodicals⁹. It was reviewed by the writer on 2 different occasions¹⁰ and favourably considered by pathologists. Apart from this, this was enforced in Madras to undertake fresh infections or in areas in which the disease was in incipient stage only. The report on this trial was made by Rangaswami and Griffith¹¹ in 1939, to the effect that by spending a small amount in this mode of control, a larger amount of revenue was realised by saving the rest of the crop. Virulent and highly infected areas were left alone, whence fresh infections to other areas were rendered possible. That showed a poor appreciation of the researches on this aspect. Apart from this, Mysore did not think of even this partial control till today. In the end, spike has had a very heavy toll in that State.

Kunkel¹² showed that peach trees with Yellows disease in them could be cured by keeping them exposed to a temperature of 35° C for a fortnight. They became healthy. But this reversion was not permanent in that they could be reinfected artificially and in the field. Large-sized trees required much longer exposure, perhaps months. He did not consider this as a practical procedure. In yet another method, hope was entertained by recent workers on the issue of disease-resistant varieties of sandal. In fact, it was circulated also to that effect. But soon the selected ones were spiked. When once spike sets in an area, it wipes sandal out of it sooner or later. The above workers did not accept it for a time. The search proved futile.

As the writer sees it, the present position is that the disease is being cultured to a high degree of virulence with devastating effects on the growth of sandal, whereas its study could be concentrated in pot-cultures or green houses. The damage to sandal market in this process is not realised by the scientists nor by the foresters. South India is the only source for it in the whole world.

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