OBSERVATIONS ON SOME ABNORMAL FOLIAGE IN THE SANDAL TREES OF HANGAL FOREST RANGE OF MYSORE STATE

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Two diseases are recorded from which the sandal tree, *Santalum album* L., suffers, and they are the spike disease and the leaf-curl mosaic disease. The latter is of a minor economic importance as it is not noticed commonly, but the spike disease is a deadly one which is taking a considerable toll every year. There appears to be two types of spike disease—" Rosette " spike and " Pendulous " spike disease.[1–3] A review of these diseases has appeared in a recent issue of *Indian Forester*.[4] Some of the visual characteristic symptoms of the spike and leaf-curl mosaic diseases are presented in Table I.

Table I

	Spike	Leaf-curl mosaic
Internodal distance	Becomes reduced	Normal
Leaves		
(*a*) Size	Severe reduction in size, the reduction being greater along the breadth than in length	Smaller than the healthy
(*b*) Texture and shape of leaf-blade	Stiff and erect	Curled, wrinkled, thickened, brittle and abscissing
(*c*) Colour	Pale green to yellow, and sometimes reddish in acute cases	Green to pale green
(*d*) Mottling	Absent	Conspicuously present
Flowering	Either scanty or altogether absent, and the flowers are sterile	Not affected; flowers are fertile

During early 1962 it was noticed that a number of sandal trees near Tadas and Hangal of the Hangal Range of the Dharwar Forest Division showed certain abnormal features. According to the information conveyed by the local forest staff, this abnormality of the leaves is a prelude to the death of the trees. Although the cause of the death is not clear, it would not be due to any local factors like rise in the water bed, soil conditions or climatic reasons, because in the same locality there are a number of perfectly healthy trees and the region is a natural sandal region. A characteristic feature of this disorder is a diminution in the size of the leaves, simulating the spike disease to some extent; in fact a casual observer, who does not have much experience with spiked sandal trees, is likely to mistake the disorder for the spike disease. Although there is a diminution in the size of the leaf, yet the diminution is more or less proportional in all directions. Hence the ratio between length and breadth (L/B) of the leaf remains more or less the same as that of the healthy leaf, while that ratio is very much different in the spiked sandal leaf.[5] A photograph of this leaf along with those of the healthy and the spike-affected leaves is given in Fig. 1.

With the onset of the disorder, certain physiological disturbances also set in the tree. Chemical examination of the leaf samples collected from the affected trees has revealed a higher Ca/N ratio when compared with the healthy leaves, while it is actually lower in the case of the spiked leaves. This high Ca/N ratio is mainly due to an abnormal accumulation of calcium in the leaves, while it is just the opposite in the case of the spiked leaves, as shown in Table II. Thus the above test appears to serve for diagnosing the new disorder and distinguishing it from the spike disease.

TABLE II

	Healthy %	Spike-diseased %	New disorder %
Calcium*	2·42	0·74	4·44
Nitrogen*	1·66	1·22	1·95
Ca/N	1·47	0·61	2·27
L/B of leaves ..	2·47	5·02	2·69

* On zero-moisture basis; average of 10 values.

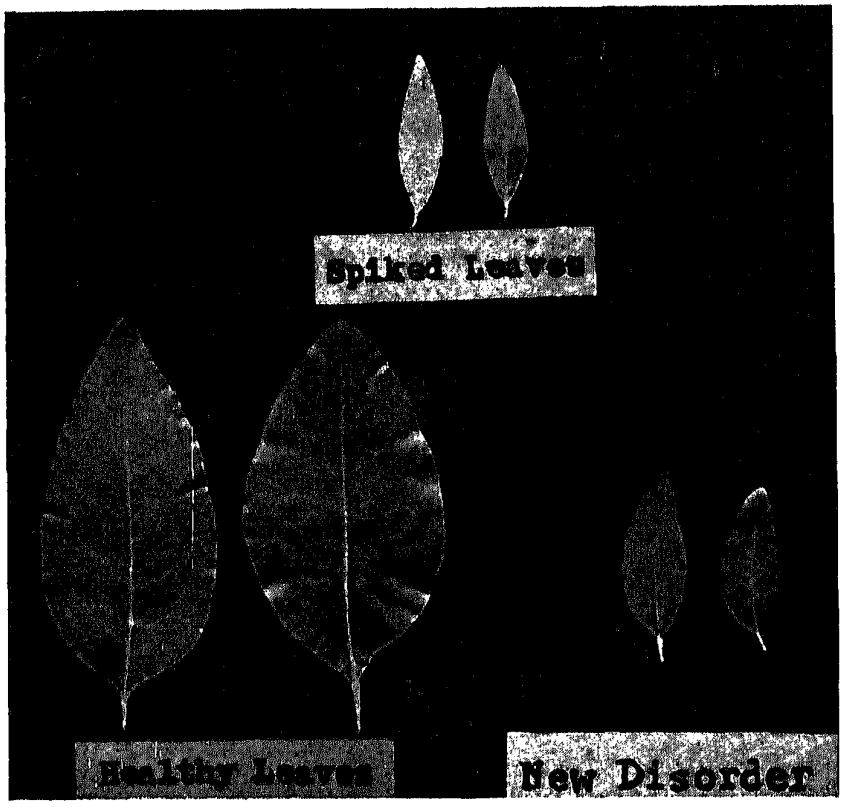

FIG. 1

At present nothing can be said about the etiology or the mode of spread of the disorder. However, the recent reports have indicated that some of the affected trees have recovered.

References

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