

COLLATERAL HOSTS OF *CORYNEBACTERIUM* SP. CAUSING CHENTHAL DISEASE OF CARDAMOM

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ABSTRACT

*Corynebacterium* sp. is reported to be involved in the blight of cardamom and symptoms characteristic of chenthal disease were observed on certain wild species of *zinziberaceae*. The host range of the bacterium was studied with respect to eight species after spraying the bacterial suspension. *Curcuma angustifolia* did not exhibit any symptoms. Mild infection was noted on *Alpinia galange*. Water soaked lesions were observed on *Aframomum malequeta* and *Zingiber officinale*.

INTRODUCTION

The blight of cardamom, familiarly known as chenthal disease is characterised by the appearance of initially water-soaked lesions of varying sizes on the abaxial surface of young leaves which later turn brown to dark in colour with a pale yellow halo. As the withering of leaves progresses the pseudostems wilt. The involvement of *Corynebacterium* sp. in the blight of cardamom has been reported (George et al., 1976). A survey of the cardamom growing tracts of the Western Ghats revealed the spread and factors influencing the disease (George and Jayasankar, 1979). The characteristic symptoms of chenthal disease observed during the survey on certain wild *Zingiberaceae* plants prompted a study to be made on the host range of this bacterium.

### MATERIALS AND METHODS

Eight *Zingiberaceae* plants were raised in earthen pots holding 15 kg soil by planting pieces of underground stem. These pots were maintained in a glasshouse. The *Corynebacterium* isolate from cardamom was multiplied in nutrient broth. After 24 hours incubation the inoculated broth was centrifuged at 6000 rpm and the bacterial cells were sedimented and resuspended in saline. The turbidity of the suspension was adjusted to contain approximately  $10^7$  cells/ml (O.D. 0.7 to 0.9). The potted plants were covered with polythene bags and inside of polythene cover was sprinkled with water to maintain increased relative humidity. The plants were sprayed with the bacterial suspension after 12 hours using an atomiser both on the adaxial and abaxial surface of the leaves. Polythene covers were sprinkled with water periodically on the subsequent days. The abaxial surface of the leaves were observed for the water-soaked lesions characteristic of *Corynebacterium* infection in chenthal disease. Bits of leaf showing water-soaked lesions were washed in several turns of sterile water and plated on nutrient agar to reisolate the pathogen. The bacterium encountered was compared to the original isolate.

### RESULTS AND DISCUSSION

The intensity of symptom expression by the different plants sprayed upon with the pathogen is expressed in Table 1. Among the *Zingiberaceae* plants tested, *Curcuma angustifolia* failed to exhibit any reaction to inoculation with *Corynebacterium* whereas in *Aframomum malegueta* and *Zingiber officinale* characteristic water-soaked lesions were observed after 60 hours. Even though only mild infection was noticed in *Alpinia galanga*, the water-soaked lesions turned to brown spots within 60 hours. Except in *Alpinia galanga* in all other plants the water-soaked lesions persisted as such, for four to five days and disappeared later with no further progression of symptoms. On planting, the bits of leaf showing water-soaked lesions, the pathogen was reisolated. Chenthal causing *Corynebacterium* and its host cardamom prefers to thrive better in comparatively cooler weather conditions. One of the reasons for failure of a symptom development in these plants may be attributed to the higher temperature of the plains

Table 1. Intensity of water-soaked lesions on spraying with *Corynebacterium* sp.

Plant	Observations	
	24 h	60 h
1. <i>Curcuma angustifolia</i> , Roxb.	Nil	Nil
2. <i>Alpinia galanga</i> , Willd.	+	Developing brown spot
3. <i>Hedychium coronarium</i> , Koen.	+	as such
4. <i>Zingiber zerumbet</i> , Smith.	+++	as such
5. <i>Curcuma longa</i> , Linn.	+++	as such
6. <i>Aframomum malegueta</i> , K. Sch.	Nil	++
7. <i>Amomum muricatum</i> , Beddome	+++	as such
8. <i>Zingiber officinale</i> , Rosc.	Nil	+

where the study was conducted. The same reason holds good for the non-occurrence of this disease on the *Zingiberaceae* plants growing on the plains. But characteristic symptoms were observed on *Alpinia malaccensis*, a wild species of *Zingiberaceae* growing in the border of a certain cardamom estate. Symptoms were also observed on *Hedichium coronarium*, *Aframomum malegueta* and *Alpinia calcarata* maintained in the farm of cardamom research station, Pampadumpara. The record of chenthal symptoms on *Hedichium coronarium* may be of importance as *Hedichium* sp. is used for intergeneric hybridisation of cardamom—an attempt to build up resistance against 'Katte' disease of cardamom.

#### REFERENCES

- George, M., Joseph Thomas, V.P. Potty and N.P. Jayasankar, 1976. A bacterial blight disease of cardamom. *J. Plant. Crops* 4 (1): 23-24.
- George, M. and N.P. Jayasankar, 1979. Distribution and factors influencing Chenthal disease of cardamom. *Proc. PLACRO-SYM II*: 343-347.

**DISCUSSION**

**Q** : Could you isolate the *Corynebacterium* from the artificially inoculated plants which took infection?

**Ans:** Yes.

**Q** : Did you observe the association of *Cercospora* spores with Chenthal disease?

**Ans:** Similar symptoms were found to be caused by *Cercospora* in Malabar variety.