# Diurnal Periodicity of Spore Liberation in *Corynespora cassiicola* (Berk, & Curt.) Wei.*

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*Corynespora cassiicola* (Berk, & Curt.) Wei., is known to cause leaf spot diseases on a number of economically important plants. Target leaf spot of tomato is one among them. Preliminary field observations indicated that conidia of this fungus are present in numbers in the atmosphere around infected tomato plants. An attempt was therefore made to determine the concentration of spores in the atmosphere and also the periodicity of its occurrence.

## Meterials and Methods

A simple spore trap was designed for sampling the air and collecting the spores (Fig. 1). The trap consisted of a two litre pressure flask, fitted with a one-holed rubber bung. A copper tube 45 cm. long and 9 mm diameter was tightly fitted in the hole in the rubber bung in such a manner that 20 cm of the tube was outside the rubber bung. This portion was bent at right angles. The lower end of the copper tube, about 1.5 cm, was also bent at right angles in the opposite direction. The opening at the lower end of the tube was flattened to make a rectangular orifice, about 11 mm. X 2 mm.

A vertical metal rod fixed on the underside of the rubber bung helped to hold the slide in position by means of a suitable clip. The position of the lower rectangular orifice of the copper tube was so arranged that it was 0.5 mm away from the slide. The outlet of the flask was attached to a suction pump. The trap was mounted on a stand and the orifice of the trap was always kept in line with the upper level of the growing crop by adjusting the height of the stand. The volume of air sucked in was periodically checked and recorded.

This trap has many drawbacks and consequently its efficiency is considered low. The trap was fixed and it had to be manually adjusted to face the wind at each setting. Further, the slides are not movable automatically. In order to overcome this difficulty to a certain extent the slides were changed every two hours.

Ordinary microscope slides smeared on one side with a film of 9 : 1 mixture of vaseline and paraffin wax was used in the trap. These slides after exposure were scanned in an ordinary microscope. All the spores on a slide were counted and

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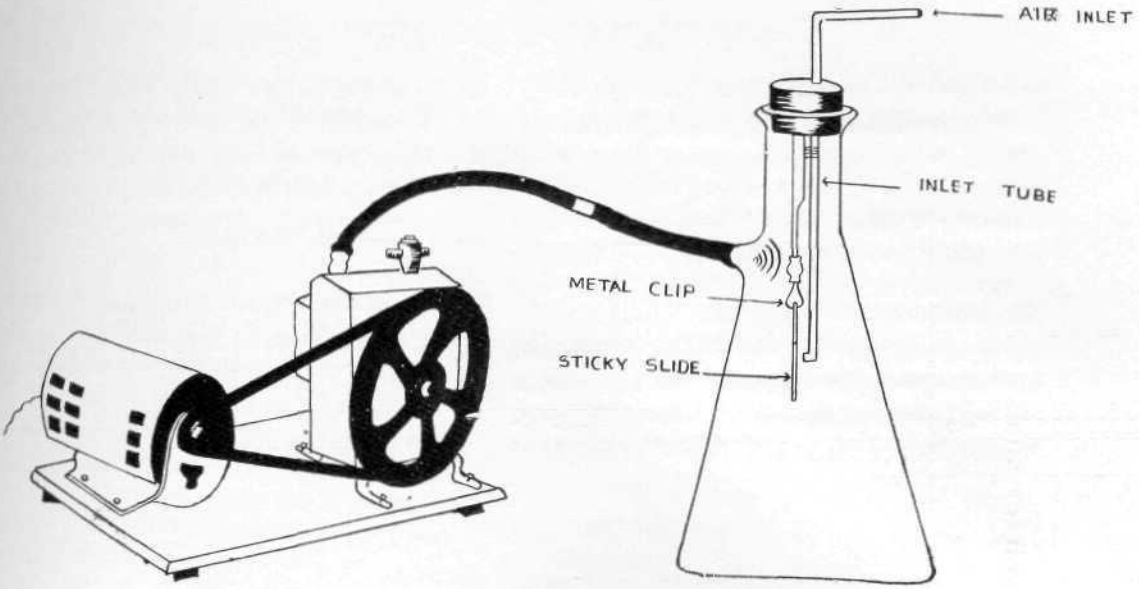


Fig. ]. The simple spore trap designed and used in the present study.

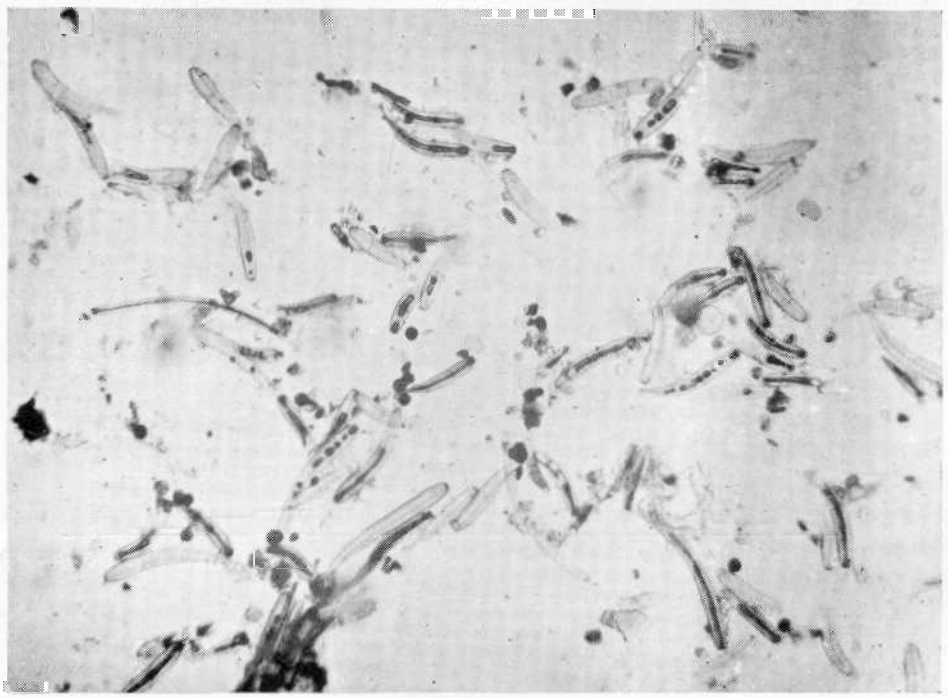

Fig. 2. Microphotograph of ɟ1 portion of a slide from the spore trap showing spores of *Corynespora cassiicola*.

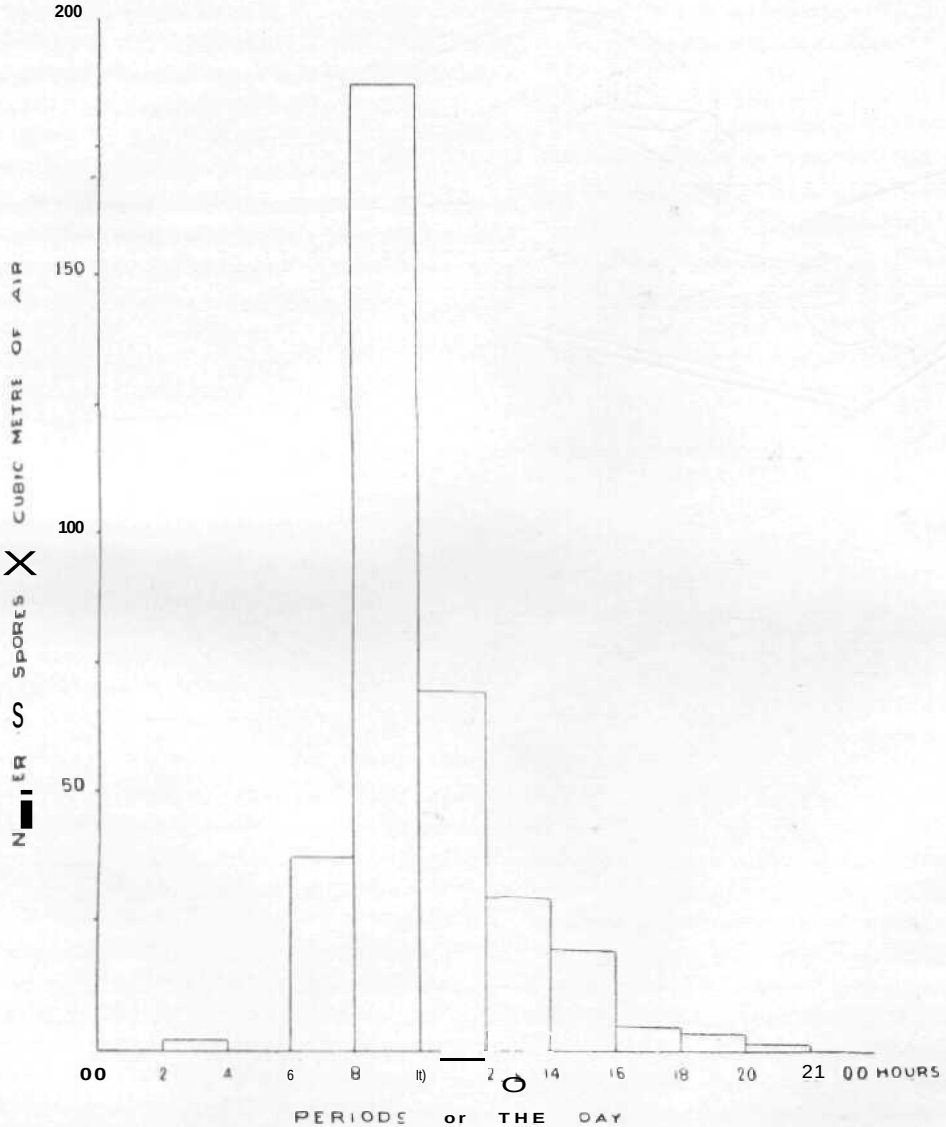


Fig. 3. Average concentration of spores of *Corynespora cassiicola* in the atmosphere during different periods of the day.

the spore load is expressed in terms of numbers per cubic metre of air.

## Results

The spores of *Corynespora cassiicola* were found in sufficient numbers on the slides of the spore trap which was set up in the infected tomato field (Fig. 2). The maximum number of spores occurred during the day time. Practically no spores were present in the atmosphere during the night. The fungus thus exhibited a marked diurnal periodicity in the dispersal of its spores. This diurnal periodicity with a day maxima was found to be a constant feature.

There was also marked difference in the spore load during the different periods of the day. Spores began to appear in the early morning hours between 6 and 8 in small numbers. The spore load rapidly increased and reached the highest between 8 and 10 a. m. The concentration of spores decreased as the day advanced. The fall in spore load till noon was gradual, but that in the afternoon was very marked. By evening the spore load was practically nil (Fig. 3).

## Discussion

Spore of *C. cassiicola* began to appear at 6 a.m., and the highest concentration of spores was reached between 8 and 10 a. m. The spore load then began to fall and by evening it was almost nil. Practically no spores were present in the atmosphere during night. Thus the fungus exhibited a marked diurnal periodicity in the liberation of its spores. In addition there was also a definite pattern of liberation of spores during the different periods of the day.

The existence of such a diurnal periodicity in spore liberation is known for a number of other fungi also. Hirst (1953) found a marked diurnal periodicity of spore liberation for *Phytophthora infestans* and *Polythrincium trifolii*. For these fungi also the highest spore load occurred between 8 and 10 a. m. Sreeramulu (1959) reported that maximum number of spores of *Polythrincium trifolii* and *Epicoccum* sp. occurred during the forenoon. Subsequently Sreeramulu and Ramalingam (1963) found that *Trichoconis padwickii* and *Cercospora* sp. occurred in their maximum by 10 a. m.

The factors which determine the regularity of spore discharge in *Corynespora cassiicola* are not properly understood. It is likely that the forenoon pattern of spore dispersal exhibited by the fungus may be governed by factors such as lowering of the humidity and the raising of temperature which favour the drying up of the substratum.

## Summary

The concentration of the spores of *Corynespora cassiicola* during the different periods of the day inside a tomato crop infected by the fungus was determined by using an improvised spore trap. The air was sampled periodically and the spores were trapped on sticky microscope slides.

The fungus exhibited a definite pattern of diurnal periodicity in the liberation of its spores. The spores began to appear in the early morning and the maximum concentration was attained between 8 and 10 a. m. after which the spore load began to fall. Practically no spores were present during the night. It is suggested that the drying up of the substratum as a result of the increasing temperature and falling humidity may account for the daily recurrence of the forenoon pattern of spore dispersal.

**Acknowledgement**

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