



# Epidemiology of grey blight of coconut (*Cocos nucifera*. L)

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## Abstract

**A**mong the various diseases affecting coconut palm, the grey blight is of common occurrence in almost all the coconut growing areas. The disease is caused by the fungus *Pestalotiopsis palmarum* (Cooke) Stey. The epidemiological study revealed that the disease incidence and intensity were high in the month of August, when the relative humidity was above 83 per cent. The maximum and minimum temperature observed during this period was 29.70 and 20.70 C. The rainfall observed during this period was 243.3 mm. There was a positive correlation on the incidence and intensity of grey blight disease with rainfall, R.H and wind speed.

## Introduction

The grey blight disease of coconut palm also known as grey leaf spot was considered as a minor disease of coconut in the early 1980's. With the injudicious management practices, this disease has emerged as a major problem in coconut cultivation especially in the southern part of Kerala. Though this is a foliage disease, the severely affected palms loose their vigour, since the disease affected the photosynthetic capacity of the palms, thereby reducing the yield of the palms. The disease is seen in both mature palms as well as in seedlings

causing reduction in the vigour of the seedlings, stunted growth and poor yield. The disease also decreased the nut yield of palms by 10.0 to 23.6 per cent (Karthikeyan *et al.*, 2002).

Ramakrishnan and Subramanian (1952) reported the occurrence of *Pestalotia palmarum* Cooke on coconut in Travancore Kerala. Anxianshu and Han Lianjian (1994) reported that the coconut leaf spot (*Pestalotiopsis palmarum*) caused yield loss of 22,40,000 fruits in a growing area of 34,800 mu. (1mu = 0.067 ha) in Hainan in China. Adult palms of 20-40 years of age were highly susceptible to the disease.

## Materials and Methods

An epidemiological study was conducted at the Coconut Research Station, Balaramapuram, Trivandrum for a period of one year from April 2001 to April 2002. The maximum and minimum temperatures, the relative humidity, rainfall and wind speed etc during the period were recorded at bimonthly intervals. The percent disease incidence and intensity were assessed using a standard score chart described by Jayaraj *et al* (1986) with little modifications. Twenty five leaflets were selected from the middle of the five leaves from the lowest whorl from each coconut tree and were graded

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from 0 to 9. The details of the score chart is as follows:

| Disease grade | Description                                     |
|---------------|---|
| 0             | No spots  |
| 1             | 1 to 10 percent of the leaf area affected       |
| 3             | 11 to 25 percent of the leaf area affected.     |
| 5             | 26 to 50 percent of the leaf area affected      |
| 7             | 51 to 75 percent of the leaf area affected.     |
| 9             | More than 75 percent of the leaf area affected. |

A total number of 216 palms were in the trial. Out of this one palm per 50 sq. m area was observed for the disease incidence and intensity. The fifth leaf from the base of the crown was taken as a representative sample. The per cent disease index was worked as described by Horsfall and Heuberger (1942). The Percent Disease Index (PDI) was assessed using the formula.

$$\text{Percent Disease Index (PDI)} = \frac{\sum \text{ of Numerical ratings}}{\text{Number of leaves observed} \times \text{Maximum disease grade}} \times 100$$

$$\text{Disease Incidence} = \frac{\text{Number of affected leaves}}{\text{Total number of leaves}} \times 100$$

**Table 1.** Weather factors in relation to disease incidence (DI) and disease intensity (PDI) on grey blight of coconut for the period from April 2001 to April 2002

| Period   | DI       |          |          | PDI      |          |          | Temperature, °C |          | RH%   | RF, mm | Wind speed, kmph |
|----------|----------|----------|----------|----------|----------|----------|-----------------|----------|-------|--------|------------------|
|          | Maxi mum | Mini mum | Aver age | Maxi mum | Mini mum | Aver age | Maxi mum        | Mini mum |       |        |                  |
| Apr 2001 | 47.30    | 39.50    | 43.20    | 38.05    | 27.80    | 32.70    | 31.30           | 21.9     | 79.5  | 209.0  | 5.6              |
| Jun 2001 | 51.00    | 40.75    | 47.24    | 44.85    | 33.55    | 33.72    | 31.50           | 21.90    | 81.5  | 181.1  | 6.6              |
| Aug 2001 | 56.50    | 50.50    | 53.43    | 49.00    | 34.90    | 43.60    | 29.70           | 20.70    | 83.60 | 243.30 | 7.8              |
| Oct 2001 | 48.05    | 41.10    | 45.42    | 43.10    | 37.50    | 40.78    | 30.10           | 24.00    | 83.70 | 407.60 | 8.5              |
| Dec 2001 | 46.00    | 39.95    | 40.93    | 36.00    | 29.60    | 32.67    | 30.60           | 22.90    | 81.20 | 129.40 | 5.7              |
| Feb 2002 | 41.35    | 34.70    | 37.90    | 32.50    | 27.65    | 30.93    | 31.4            | 22.3     | 77.2  | 15.0   | 7.0              |
| Apr 2002 | 44.00    | 38.50    | 40.90    | 39.55    | 31.45    | 35.41    | 33.10           | 24.2     | 76.40 | 33.7   | 8.3              |

### Results and Discussion

The average Disease Index (DI) ranged between 37.00 per cent (February) and 53.43 percent (August) (Table 1). The DI gradually increased from February and reached maximum during August and subsequently showed a declining trend. The maximum temperature similarly showed an increasing

**Table 2.** Correlation between Per cent disease incidence and disease intensity with weather parameters

| Weather Parameters       | PDI(r value) | DI (r value) |
|--------------------------|--------------|--------------|
| Maximum temperature (°C) | -0.607       | -0.544       |
| Minimum temperature (°C) | -0.376       | -0.109       |
| Relative Humidity (°C)   | 0.481        | 0.267        |
| Rain fall (mm)           | 0.644        | 0.697        |
| Wind speed (Kmph)        | 0.265        | 0.519        |


trend from August to April and then showed a reducing trend. The relative humidity during April 2001 to April 2002 ranged between 76.42 and 83.7 percent.

The per cent disease index during April 2001 to April 2002 ranged between 30.93 (February) and 43.60 percent (August). The disease incidence also showed the same trend. The maximum temperature similarly showed an increasing trend from August to April and showed a reducing trend.

The relative humidity during April 2001 to April 2002 ranged between 76.42 and 83.7 percent. The per cent disease index was observed low (37.90) when the R.H was less than 78 per cent.

The correlation studies on the different parameters are presented in Table 2. The rainfall and R.H have positive correlation on DI and PDI, whereas temperature showed a negative correlation. During high rainfall period (407.6 mm) though the disease incidence was noticed, it has not reached the maximum. No relationship could be noticed with wind speed and DI.

An Xianshu and Han Lianjan (1994) and Karthikeyan *et. al* (2002) also reported the influence of high rainfall and wind speed on the grey blight of coconut palms. The effect of weather parameters on the foliar disease was reported by several workers (Bhaskaran and Kandaswamy, 1977, Chandramohan *et. al.*, 1987, Suhag and Duhan, 1984). Suriachandra Selvan *et. al* (1991) reported high incidence of grey blight with moderate rainfall and high relative humidity in Tamil Nadu.



The information on the occurrence of grey blight incidence and weather parameters is highly useful so that the farmers may be warranted for taking necessary action for spraying fungicides. Timely spraying can minimize the spread of the disease.

### Acknowledgement

The authors are thankful to Kerala Agricultural University for the facilities provided.

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## Coconut oil powers island's cars

People on the island of Bougainville in Papua New Guinea have found their own solution to high energy prices

They are developing mini-refineries that produce a coconut oil that can replace diesel. From police officers to priests, the locals are powering up their vehicles and generators with coco-fuel. Inquiries for the coconut power have come in from overseas, including Iran and Europe. For years, the people of Bougainville have been dependent on expensive fuel imported onto the island. Shortages have often caused many businesses in this part of Papua New Guinea to grind to a halt. High energy costs have not helped either.

Increasingly, locals are turning to a cheaper and far more sustainable alternative to diesel.

Coconut oil is being produced at a growing number of backyard refineries. Matthias Horn, a German migrant and an engineer, operates one such refinery. "They sometimes refer to me as the Mad German

Doesn't it sound good if you really run your car on something which falls off a tree and that's the good thing about it - Matthias Horn

because how can you do that to your car... filling it with some coconut juice that you normally fry your fish in," he said. "The coconut tree is a beautiful tree. Doesn't it sound good if you really run your car on something which falls off a tree and that's the good thing about it. You run your car and it smells nice and

it's environmentally friendly and that's the main thing." Mr Horn said his work had attracted interest from Iran. Refineries like this also produce oils for cooking and cosmetics as well as soap. Coconut power is not new in Bougainville.

The Island endured years of civil unrest in which thousands of people were killed in a fight for independence in the 1990s. Dwindling supplies of diesel forced islanders to look for alternatives and the coconut was chosen. In peacetime, new technology is propelling this sweet-smelling industry to greater heights.

Source : BBC NEWS



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