

OCCURANCE OF *CYLINDROCLADIUM QUINQUESEPTATUM* LEAF SPOT ON *HEVEA BRASILIENSIS* IN SRI LANKA

C.K. Jayasinghe*, W.P.K. Silva and Najith Nishantha

Department of Plant Pathology and Microbiology, Rubber Research Institute of Sri Lanka, Dartonfield,
Agalawatta, Sri Lanka.
Accepted 12 May 2009

ABSTRACT

Cylindrocladium quinqueseptatum is a serious pathogen of tree crops in the tropics. It has been shown that rubber is also affected by this pathogen in Malaysia and China. This is the first report of the natural occurrence of *Cylindrocladium quinqueseptatum* on *Hevea brasiliensis* in Sri Lanka.

Key words: Leaf diseases, fungal pathogen, rubber

INTRODUCTION

Cylindrocladium quinqueseptatum Boedijn and Reitsma (Telemorph: *Calonectria quinqueseptatum* Figueiredo and Namekata) is a common pathogen of *Eucalyptus* spp. in Northern Australia (Pitkethley, 1976), Brazil (Figueiredo and Nemeckato, 1967), India (Sharma and Mohanan, 1982), Indonesia (Peerally, 1974), Mauritius (Peerally, 1974) and Vanuatu (Ivory *et al.*, 1993) and on *Eugenia caryophyllata* (clove) in India (Sharma and Nambiar, 1978), Indonesia (Reitsma and Slooff, 1950) and Sri Lanka (Jayasinghe and Liyanage, 1982). It is also reported to cause leaf spots and defoliation in certain clones of *Hevea brasiliensis* in Malaysia (Anon, 1972), and China (Kaiming, 1987), *Anona squamosa* in Brazil (Figueiredo and Nemeckato, 1967), *Terminalia paniculata* in India (Mohanan and Sharma, 1985) and *Camellia sinensis* (Peerally, 1974).

In Sri Lanka *Cylindrocladium quinqueseptatum* was first recorded in 1993 on *Eugenia caryophyllata* (Jayasinghe and Liyanage, 1982) from Rathnapura district. The fungus caused considerable mortality of seedlings in polybag nurseries and severe defoliation of young plants of *E. caryophyllata*

especially during the South-West monsoon period. With the discovery of *Cylindrocladium quinqueseptatum* on clove in Sri Lanka, a study was conducted to find the pathogenicity of clove isolate on rubber as it has been reported that several rubber clones in Malaysia have been severely affected by this pathogen (Anon, 1990). The observations of the artificial inoculation studies proved that clove isolate is a potential pathogen of majority of the rubber clones cultivated in Sri Lanka (Jayasinghe and Wijesundara, 1996). Since then islandwide surveys were conducted regularly in rubber plantations to find the occurrence of any natural infections on rubber tree.

During the latter part of the year 2003, an unusual leaf spot disease similar to *Cylindrocladium* leaf spot symptoms described in Malaysia was observed from two year old rubber plants of the clone RRISL 206 at Baduraliya, Kalutara. Disease symptoms consisted of numerous raised chlorotic spots. These pin head size lesions were more prominent on mature leaves and at later stages they became purplish brown in colour (Fig. 1). In 2008, typical disease symptoms were noticed in two more rubber clones namely RRISL 210 and RRISL 217 grown in bud wood nurseries.

*Corresponding Author's email: dirrch@slt.net.lk



Figure 1. Leaves of rubber plants from Sri Lanka naturally infected with *C. quinqueseptatum*.

MATERIALS AND METHODS

Diseased specimens were collected from Baduraliya in Kaluthara district and the symptoms were studied. The causal organism was isolated from the leaves on to Czapek's Dox Agar (CDA). Pure cultures were obtained and consequently single spore isolations were done. The fungal isolate was sent to the Commonwealth Mycological Institute, UK for authentication. The pathogen was identified as *Cylindrocladium quinqueseptatum* Boedjin and Reitsma and the specimen culture was deposited in the International Mycological Institute (IMI) herbarium IMI 391089. Koch's postulates were proved using polybag plants of clone RRISL 206. The plants were inoculated using conidial suspensions 5×10^4 conidia / ml and incubated in moist chambers. Regular inspections were made for the appearance of disease symptoms. Isolations were made again from the resulting lesions on CDA.

Detached leaves from other common clones viz RRIC 100, RRIC 121, RRIC 102, RRIC 130, PB 260, PB 28/59, PB 86, RRISL 217, RRISL 218, RRISL 201, RRISL 203, RRIM 600, TJIR 1, IAN 717 were also artificially inoculated to study the pathogenicity levels.

Leaves from above clones of *Hevea brasiliensis* which are susceptible to *C. quinqueseptatum* were inoculated with 10 μ l drops of a conidial suspension containing 10^3

conidiospores ml⁻¹, obtained from pure culture. Inoculated leaves were maintained in moist chambers at room temperature under normal light and dark conditions, each treatment consisted of 6 replicate of leaves. Controls were inoculated with sterilized distilled water.

RESULTS

The inoculated leaves showed leaf spots leading to lesions, the typical symptom of *Cylindrocladium* leaf spots. *C. quinqueseptatum* was confirmed from the lesions on re - isolation.

Colony and conidiospore characteristics

Colonies on CDA were effuse, orange to chestnut (Fig. 2a). The underneath was brown (Fig. 2b). Conidiophore branches arise laterally from a stipe (Fig. 3a), primary branches non-septate or one septate and 8.4-26.6 μ m long. Secondary and tertiary branches non septate, (11.5-15.6) μ m. Phialides hyaline, (13.0-15.60) μ m long. Conidia hyaline, straight, cylindrical, 5 septate. 59.8-104.6 X 5.2-7 μ m *in vivo* and 72.8-119.6 X 5.2-7.8 μ m *in vitro* (Fig. 3c).

Sterile filaments terminate in a narrowly clavate vesicle (Fig. 3b) (2.5-3.0) μ m wide. Leaves inoculated with *C. quinqueseptatum* developed lesions three days after inoculation from which the fungus was successfully re-isolated.



Figure 2. *C. quinqueseptatum* colony obtained from *H. brasiliensis* grown on CDA and viewed from (a) above and (b) below.

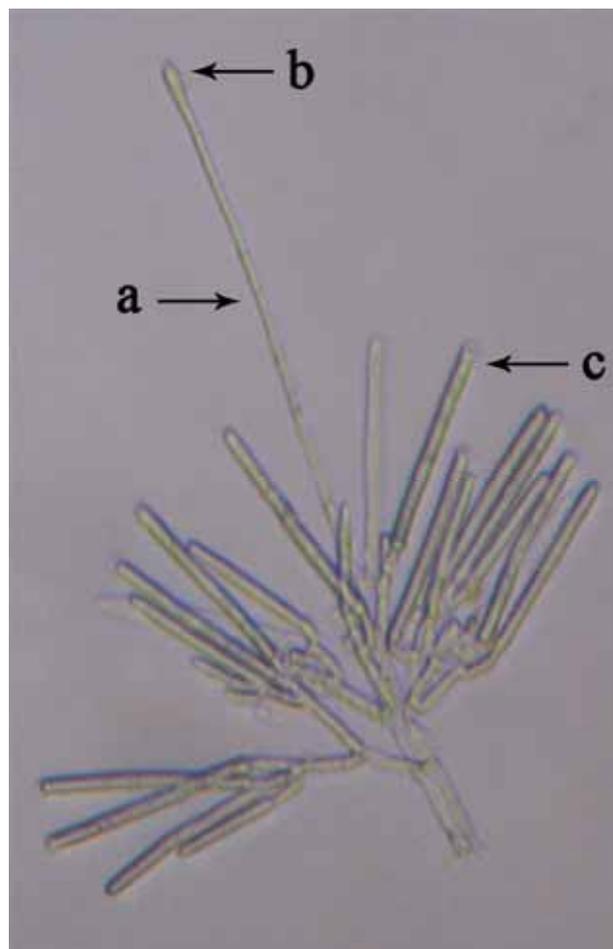


Figure 3. Penicillately branched conidiophore (a) Stipe, (b) Characteristic clavate vesicle at the apex of the stipe and (c) Conidia.

CONCLUSION

This is the first report of the occurrence of *Cylindrocladium quinqueseptatum* on *Hevea brasiliensis* in Sri Lanka, No other report of this nature has been recorded in Sri Lanka (Jayasinghe, 2001) except that rubber has been shown to be a potential alternate host following artificial inoculations (Jayasinghe and Wijesundera, 1996).

ACKNOWLEDGEMENTS

Authors thank Mr. Wimal Amaratunga and Mr. Priyantha Pieris for providing photographs.

REFERENCES

- Anon (1972). A new nursery leaf spot disease of *Hevea* caused by *Cylindrocladium quinqueseptatum*. *Planters Bulletin* Pp. 55–56.
- Anon (1990). Notes for estate managers. Rubber Research Institute of Malaysia, Malaysia Pp.1–2.
- Figueiredo, M.B. and Namekata, T. (1967). Record of *Calonectria quinqueseptata*, perfect state of *Cylindrocladium quinqueseptatum* on *Anona squamosa* and *Eucalyptus* spp. *Arquivos do Instituto Biologico* **34**: 91–96.
- Ivory, M.H. Daruhi, G. and Dick, A.M.P. (1993). New leaf diseases of forest trees recorded in Vanuatu. *FAO Plant Protection Bulletin* **41**: 38–39.
- Jayasinghe, C.K. (2001). *Check list of rubber pathogens in Sri Lanka*, National Science Foundation, Colombo Pp. 48.
- Jayasinghe, C.K. and Liyanage, A de S. (1982). Leaf spot in clove. *Annual Review of Rubber Research Institute of Sri Lanka* Pp. 70.
- Jayasinghe, C.K. and Wijesundara R.L.C. (1996). Morphological cultural and pathogenic variation among the clove isolates of *Cylindrocladium quinqueseptatum*. *Journal of Plantation crops* **24**(1): 34–42.
- Kaiming, Z. (1987). Important disease of Rubber trees in China. With special references to *Oidium* and *Phytophthora*. Proceedings of International Rubber Research and Development Board Symposium held in Thailand Pp. 40–50.
- Mohan, C. and Sharma J.K. (1985). Shot hole disease of *Terminalia paniculata* caused by *Cylindrocladium quinqueseptatum* – a new record. *European Journal of Forest Pathology* **15**:157–159.
- Peerally, A. (1974). CMI description of pathogenic fungi and bacteria. No; 423. *Calonectria* (conidial state; *Cylindrocladium quinqueseptatum*).
- Peerally, A. (1974). An elucidation of certain diseases of tea caused by *Calonectria* spp. *Revue Agricole et Sucriere de l'île Maurice* **53**: 57–66.
- Pitkethley, R.N. (1976). *Cylindrocladium quinqueseptatum* on myrtaceous tree seedlings. *Australian Plant Pathology Society Newsletter* **5**: 57.
- Reitsma, J. and Slooff, W.C. (1950). Leaf disease of clove seedlings, caused by *Gloeosporium piperatum* E. & E. and *Cylindrocladium quinqueseptatum*. *Contributions of General Agriculture Research Station, Bogor* **109**: 50–59.
- Sharma, J.K. and Mohanan, C. (1982). *Cylindrocladium* spp. associated with various diseases of *Eucalyptus* in Kerala. *European Journal of Forest Pathology* **12**: 129–136.
- Sarma, Y.R., and Nambiar, K.K.N. (1978). *Cylindrocladium* leaf rot of clove. *Plant Disease Reporter* **62**: 562–564.