Xylophagous fungi of urban trees in Buenos Aires City

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Xylophagous fungi of urban trees in Buenos Aires City

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Urban trees frequently suffer from injuries caused by improper pruning and are also weakened by other stress conditions, such as air and water pollutants, which affect their vegetative and reproductive growth. Stress generally predisposes trees to fungal attack by reducing their vigour, thus compromising host defences. The value of trees in towns is greatly influenced by the presence of xylophagous fungi which are the main causes of wood decomposition.

Since no direct control for wood decay fungi is known, losses from these fungi can be minimized by use of preventive measures which would reduce the deterioration of healthy trees, overcome storm damage, and reduce the source of fungal inoculum. The detection of early stages of rot in trees without symptoms could be of great interest when planning the replacement of unhealthy trees. This might be possible by identifying potential fungal pathogens before the fruit-bodies are formed, by recognizing their vegetative characters in culture. During the last 50 years, the use of cultural characters in taxonomy has increased, mosly concerning the wood-rotting Aphyllophorales (Davidson et al, 1942; Nobles 1948, 1958, 1965; Stalpers, 1978; Nakasone, 1990; Wright & Deschamps, 1972, 1974).

The purpose of this work is to enumerate the species of xylophagous basidiomycetes present in the Buenos Aires City environment and to provide additional data concerning host relationships of these species.

Material and Methods

Over 4000 trees were examined in a survey made from March to June 1994. Fruit-bodies were removed from hosts and taken to the laboratory where tissue cultures were made. Cultural studies were undertaken according to Nobles (1965), and cultural characters of each species were determined. Numbers from 1 to 63 were used as symbols for the characters that have diagnostic value in the identification. These numbers are the code symbols and the series of code symbols that expresses the cultural characters shown by a species constitute the species code for that species. The species codes are given for all the species except for *Lopharia cinerascens* (Schwein.) G. Cunn, from which a culture was not obtained.

Cultures were grown on Malt Extract Agar in darkness at 25°C, and macro- and micromorphological characters were recorded on a weekly basis. Oxidase reactions were performed to determine the type of rot, using gallic and tannic acid agar media, and the results recorded one week after incubation. Reactions

Fig 1. Brown cubic rot on *Eucalyptus* sp. caused by *Laetiporus sulphureus*

with tyrosine, paracresol and guaiacol 0.2 % agar media were also recorded, according to Boidin (1954).

Results

A total of 14 different species were noticed growing on 12 taxa of woody host plants: 11 belong to the Aphyllophorales and three to the Agaricales, as follows.

Aphyllophorales

Bjerkandera adusta (Willd. : Fr.) Karst.

Host: *Platanus acerifolia*

Species code: 2.3.7.(26).35.37.38.40.42.54.55

Oxidase reactions: gallic acid: +++; tannic acid: ++++; guaiacol: -; paracresol: -; tyrosine: -. The description coincides with that given for the species by Stalpers (1978) and Nobles (1965).

Ganoderma applanatum (Pers.) Pat.

Hosts: *Platanus acerifolia, Casuarina cunninghamiana* and *Gleditsia triacanthos*

Species code: 2.3.89.10.32.37.38.43.44.54.55

Oxidase reactions: gallic acid: +++++; tannic acid: +++++; guaiacol: +++; tyrosine: -; paracresol: ++.

The description coincides with that given for the species by Wright & Deschamps (1972).

Ganoderma resinaceum Boud.

Hosts: *Platanus acerifolia, Acer negundo* and *Acacia melanoxylon*

Species code: 2.3.8.10.34.37.39.40.41.-42.54

Oxidase reactions: gallic acid: +++++; tannic acid: +++++; tyrosine: +++++; paracresol:-; guaiacol: -. The description coincides with that given for the species by Bazzalo & Wright (1982), Stalpers (1978) and Nobles (1965).

Inonotus patouillardii (Rick) Imaz.

Hosts: *Platanus acerifolia, Acer negundo, Acacia melanoxylon, Fraxinus* sp., *Casuarina cunninghamiana* and *Celtis australis*

Species code: 2.6.8.11.18.34.37.39.42.53.54

Oxidase reactions: gallic acid: ++++; tannic acid: +++++; guaiacol: ++++; tyrosine: +++; paracresol: -.

The description coincides with that given for the species by Wright & Iaconis (1955).

Laetiporus sulphureus (Bull : Fr.) Murrill

Host: *Eucalyptus* sp.(Fig 1)

Species code: 1.6.7.33.34.35.36.38.42.54.55

Oxidase reactions: tannic acid: -; gallic acid: -; tyrosine: -; paracresol: -; guaiacol: -. The description coincides with that given for the species by Wright & Deschamps (1974).

Rigidoporus ulmarius (Sow. : Fr.) Imaz.

Hosts: *Platanus acerifolia, Acer negundo, Ulmus procera* and *Populus deltoides*

Species code: 1.(2).6.7.34.36.38.43.54

Oxidase reactions: tannic acid: +; gallic acid: -, (+); tyrosine: -; paracresol: +++; guaiacol: ++. The description coincides with that given for the species by Lombard et al. (1960) and Stalpers (1978).

Lopharia cinerascens (Schwein.) G. Cunn

Host: *Tipuana tipu*

See species code and description in Nakasone (1990)

Trametes extenuata (Dur. & Mont.) Pat.

Hosts: *Fraxinus* sp., *Casuarina cunninghamiana* and *Eucalyptus* sp.

Species code: 2.3.8.34.37.38.42.54

Oxidase reactions: tannic acid: +++; gallic acid: ++; tyrosine: ++; paracresol: ++++; guaiacol: -. See description in David (1967) and Wright *et al.* (1973).

Trametes trogii Berk.

Host: *Fraxinus* sp.

Species code: 2.3.8.32.37.38.42.54

Oxidase reactions: gallic acid: ++++; tannic acid: +++++; guaiacol: ++++; tyrosine: ++; paracresol: +++. See description in Stalpers (1978) and Wright *et al.* (1973).

Peniophora albobadia (Schwein. : Fr.) Boidin

Hosts: *Tipuana tipu* and *Casuarina cunninghamiana*

Species code: 2.3.21.32.37.39.42.43.54.55

Oxidase reactions: tannic acid: +++++; gallic acid: ++++; tyrosine: ++; paracresol: -; guaiacol: +. See descriptions in Boidin (1961) and Nakasone (1990).

Oxyporus latemarginatus (Dur. & Mont. ex Mont.) Donk

Hosts: *Platanus acerifolia* and *Fraxinus* sp.

Species code: 2.6.8.10.32.36.38.42.54

Oxidase reactions: tannic acid: +; gallic acid: +++++; tyrosine: -; paracresol: -; guaiacol: -. The description coincides with that given for the species by Stalpers (1978) and Lombard *et al.* (1960).

Agaricales

Agrocybe cylindrica (DC : Fr.) Maire
Host: *Acer negundo*
Species code: 1.3.11.34.37.39.43.54
Oxidase reactions: gallic acid: -; tannic acid: -; guaiacol: -; paracresol: -; tyrosine: ++.

Oudemansiella canarii (Jungh.) Hoehnel
Host: *Erythrina crista-galli*
Species code: 2.3.11.35.37.38.43.54
Oxidase reactions: gallic acid: +++++; tannic acid: +++++; guaiacol: +++; paracresol: -; tyrosine: -.

Gymnopilus pampeanus (Speg.) Singer
Host: *Eucalyptus* sp.
Species code: 2.3.7.34.36.38.44.54.58
Oxidase reactions: gallic acid: ++++; tannic acid: ++++; guaiacol: -; tyrosine: ++; paracresol: +++. The three species of Agaricales were studied in culture for the first time (Sede & Lopez, 1999)

Discussion

In *Acer negundo* and *Platanus acerifolia*, four and five different species of xylophagous fungi were noted respectively, indicating that these two hosts could be the most susceptible ones.

It is important to note that fruit-bodies mostly occurred on introduced woody plants, except in the cases of *Tipuana tipu*/*Lopharia cinerascens* and *Erythrina crista-galli*/*Oudemansiella canarii*. One probable hypothesis could be that the indigenous species in the urban environment are less susceptible to infection than introduced ones. This hypothesis will be investigated when pathogenicity tests are carried out.

Some species were found on a wide range of hosts, like *G. resinaceum*, *I. patouillardii* and *R. ulmarius*, whilst others were found on restricted hosts: *B. adusta*, *L. sulphureus*, *L. cinerascens* and the three agaric species.

The results obtained in this work constitute a preliminary study of xylophagous basidiomycetes in urban trees. Tests on the pathogenicity of the strains isolated from both indigenous and introduced woody plants and obtaining an insight on the penetration and colonization patterns of fungal species within the tree are needed. Thus, practical measures could be used in a more specific way and only in strictly necessary cases.

References

Bazzalo, M. E. & Wright, J. E. (1982). Survey of the Argentine species of the *Ganoderma lucidum* complex. *Mycotaxon* **16**: 293-325.

Boidin, J. (1954). Essai taxonomique sur les Hydnés resupinés et les Corticiés. Etude spéciale du comportement nucleaire et des myceliums. Thèse pour obtenir le grade de Docteur en Sciences Naturelles. Faculté de Sciences, Université de Lyon. 387 pp.

Boidin, J. (1961). Heterobasidiomycetes saprophytes et homobasidiomycetes resupinés. VIII. *Peniophora* Cke. à dendrophyses. *Revue de Mycologie* **26**: 153-172.

David, A. (1967). Caracteres myceliens de quelques *Trametes* (Polyporacées). *Le Naturaliste Canadien* **94**: 557-572.

Davidson, R. W., Campbell, W. A. &. Vaughn, D. B. (1942). Fungi causing decay of living oaks in the eastern United States and their cultural identification. United States Department of Agriculture Technical Bulletin **785**: 1-65.

Lombard, F. F., Davidson, R. W. & Lowe, J. L. (1960). Cultural characteristics of *Fomes ulmarius* and *Poria ambigua*. *Mycologia* **52**: 280-294.

Nakasone, K. K. (1990). Cultural studies and identification of wood inhabiting "Corticiaceae" and selected Hymenomycetes from North America. *Mycologia Memoir* **15**: 412 pp.

Nobles, M. K. (1948). Studies In Forest Pathology VI. Identification of cultures of wood-rotting Fungi. *Canadian Journal of Research* **26**(c): 281-431

Nobles, M. K. (1958). Cultural characters as a guide to the taxonomy and phylogeny of the Polyporaceae. *Canadian Journal of Botany* **36**: 883-926.

Nobles, M. K. (1965). Identification of cultures of wood-inhabiting Hymenomycetes. *Canadian Journal of Botany* **43**: 1097-1139.

Sede, S. M & López, S. E. (1999) Cultural studies of *Agrocybe cylindrica*, *Gymnopilus pampeanus* and *Oudemansiella canarii* (Agaricales) isolated from urban trees. *Mycotaxon*, **70**: 377-386.

Stalpers, J. A. (1978). Identification of wood-inhabiting fungi in pure culture. *Studies in Mycology* **16**: 1-248.

Wright, J. E. & Iaconis, C. L. (1955). Estudio sobre Basidiomycetes. III. "Polyporus Rickii" f. sp. "negundinis" sobre arces vivos. *Revista de Investigaciones Agriicolas* **9**: 97-109.

Wright, J. E. & Deschamps, J. (1972). Basidiomycetes xilófagos de los bosques andinopatagónicos. *Revista de Investigaciones Agropecuarias,* Serie 5, Patología Vegetal **9**: 111-195.

Wright, J. E. & Deschamps, J. (1974). Basidiomicetos xilófilos de la región Mesopotámica. II. *Revista de Investigaciones Agropecuarias*, Serie 5, Patología Vegetal **12**: 128-204.

Wright, J. E.; Deschamps, J. & Rovetta, G. (1973). Basidiomicetos xilófilos de la región Mesopotámica. I. Poliporos trametoides. *Revista de Investigaciones Agropecuarias*, Serie 5, Patología Vegetal **10**: 118-228.