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MYCOFLORA OF SENESCING LEAVES OF ORNAMENTAL PLANTS. I. NEW FUNGAL RECORDS ON SOME MONOCOTS FOR PAKISTAN

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Abstract

Senescing leaves of some ornamental monocots belonging to *Liliace*ae and *Amaryllidaceae* were found infected with *Aristatoma oeconomicum, Cephalosporium coremioides, Gloeosporium nervisequum, Hyalodendron pirinum, Kutilakesopsis macalpineae*. These fungal taxa are an addition to the fungal flora of Pakistan.

Introduction

Plant senescence is the final event in the growth and development of a plant and ultimately it leads to the death of a particular organ or whole plant. The senescence in plants is highly regulated, genetically programmed and developmentally controlled process (Woolhouse, 1984). Plant senescence is associated with significant metabolic changes like degradation of cellular materials and disintegration of organelles (Hortensteiner, 1999).

The plant senescence, although deteriorative in nature, is a critical process and recycling program for the fitness of plant. The deterioration processes in the leaf that leads to senescence begin as soon as the leaf attains its full size. Several types of structural changes are associated with leaf senescence (Curty & Engel, 1996).

Senescence of leaves is not simply concerned with death, but the leaf senescence represents a key developmental phase in the life of both annual and perennial plants, which is as ordered and complex as any other phase of development. The phenomenon of senescence provides the opportunity to attack on different parts of the plants because the immunity or immune system of plants becomes weak. The fungi, which attack the senescing parts of the plants, are known as semi parasitic fungi (Anon., 2005).

Facultative parasitic fungi obtain their food from the living remnants of the organs, which is not completely dead but proceeds towards aging. The semiparasitic fungi are weak pathogens invading hosts that are weakened by drought, etc. and fruiting when the host is highly weakened or almost dead. These fungi could be classified as the facultative saprophytes, i.e., spending most of their cycles as parasites, but capable of persisting for periods on dead materials. They may attack any part of the plant e.g. root, leaves etc. (Deacon, 1997). Among ornamentals, *Marssonina* leaf spot on birch, *Cylindrosporium* leaf spot on mulberry and walnut and brown spot needle blight on pine are examples of fungi on senescing (Weber, 1973).

Sphaerotheca pannosa f.sp. *rosae* Woron was reported as pathogen of senescing leaves of rose, forming large white patches of fungal growth on the leaves. *Botrytis* sp., and *Alternaria solani* probably parasitize the senescing leaves of tomato. (Aust & Hoyningen-Huene, 1986; Braun, 1987; Coyier, 1983; Horst, 1983; Spencer, 1978).

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Methodology

At Punjab University Floriculture Research farm, apical meristems of *Dracaena* spp., and other ornamental plants were cut for multiplication. They were planted in pots 7"diam., in soil and kept in glass house to provide warm and humid environment, conducive for rooting. Plants rooted within 3 to 4 weeks were shifted to green house for acclimatization. During this period, the leaves of some ornamental monocots were found having lesions and fungal propagules. They were investigated and five fungal species have been isolated. They have been studied macroscopically and microscopically using Stereo as well as Compound microscope. They were described and illustrated with the help of Camera Lucida. Identification was made following Gilman, 1957; Barron, 1972; Barnett & Hunter, 2003.

Enumeration of the taxa

***Aristatoma oeconomicum* [Plate 1A, E., Fig. 1A]**

Pycnidium globose, 71 µm, yellow to brown, epiphyllous, erumpent, ostiolate, setae emerging from the ostiole. Macroconidia curved, pointed at both ends, septate, septa 1-4, crescent shaped, 17–33 x 2–4 µm. Microconidia not found.

On *Dracaena fragrans* (L.) Ker-Gawl., forming yellow to brown circular spots upto 1mm in diam., Punjab University Floriculture Research Farm, Q.A. Campus, Punjab University, Lahore 11.4.2005.

ERM # 11405, Punjab University Herbarium, Lahore, Pakistan.

Remarks: This fungus has been already isolated from the leaves of *Vigna sinensis* as parasite causing zonate leaf spots (Barnett & Hunter, 2003). However this is being reported from Pakistan for the first time.

***Cephalosporium coremioides* Raillo [Plate 1B, Fig. 1D]**

Mycelium septate, branched at right angle, hyaline, 3 µm wide. The conidiophores selender, epiphyllous, non-septate, branched at almost 90° and hyaline. Conidia single-celled, non-septate, hyaline, rounded to elongated, 6 – 9 x 3 – 4 µm, developed at the tips of the side branches in the form of a chain.

On *Cordyline terminalis*, forming irregular white patches and mat of hyphae., Punjab University Floriculture Research Farm, Q.A. Campus, Punjab University, Lahore, 11.4.2005.

ERM # 114052, Punjab University Herbarium, Lahore, Pakistan.

Remarks: This fungus has been already reported as saprophytes or parasite causing vascular wilts of trees (Barnett & Hunter, 2003). This is an addition to our fungal flora.

***Gloeosporium nervisequum* (Fuckel.) Sacc. [Plate 1C, 1G., Fig. 1E]**

Acervuli subepidermal erumpent, disc-shaped or cushion-shaped, 102 µm wide.Conidiophores reduced, non-septate, unbranched, thin walled. Conidia dark green, 1-celled, ovoid to oblong, 6-8 x 3-4 µm, sometimes curved, thick walled, non-septate.

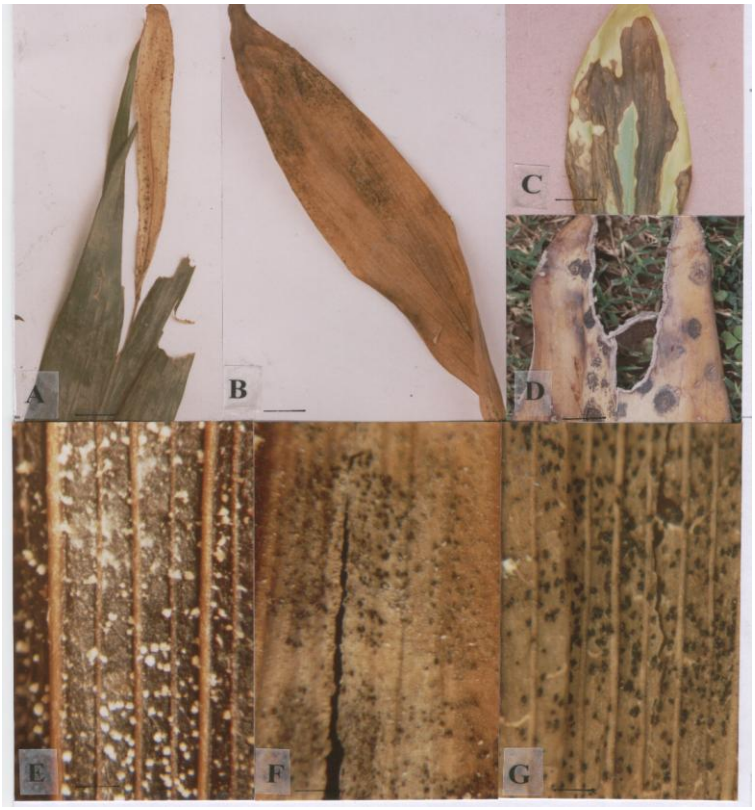

Plate 1. A–G. The infected leaves of Host Plants. (A) *Dracaena fragrans* (B) *Cordyline terminalis* (C) *D.hookeriana* (D) *Furcaraea gigantean* (E–G): Steriophotographs of Infected portions of the leaves (E) *Dracaena fragrans* (F) *Cordyline terminalis* (G) *D.hookeriana*
Scale Bar for A= 5cm, B=2cm, C= 4cm, D= 9cm, E= 8mm, F= 4mm, G= 12mm

On *Dracaena hookeriana*, forming black circular spots upto 1mm in diam., P.U. Floriculture Research Farm, Q.A. Campus, Punjab University, Lahore, 5.8.2005.

ERM # 58051, Punjab University Herbarium, Lahore, Pakistan.

Remarks: This fungus has been already reported as parasites on the leaves of *Platanus* spp., (Barnett & Hunter, 2003). This is an addition to fungal flora of Pakistan.

***Hyalodendron pirinum* Goid. [Plate 1F., Fig. 1B]**

Mycelium non-superficial or immersed in the substratum. Conidiophores hypophyllous like powdery mass of spores, erect, variable in length, simple or branched, hyaline to light green and 7 µm wide. Conidia 1-celled, thick walled, hyaline, circular to elongated 5–7 x 3–4 µm, developed terminally to the conidiophores in the form of chains.

On *Cordyline terminalis*, forming brown circular to oval spots., Lawn, Department of Botany, Q.A. Campus, Punjab University, Lahore, 18.4.2005.

ERM # 18405, Punjab University Herbarium, Lahore, Pakistan.

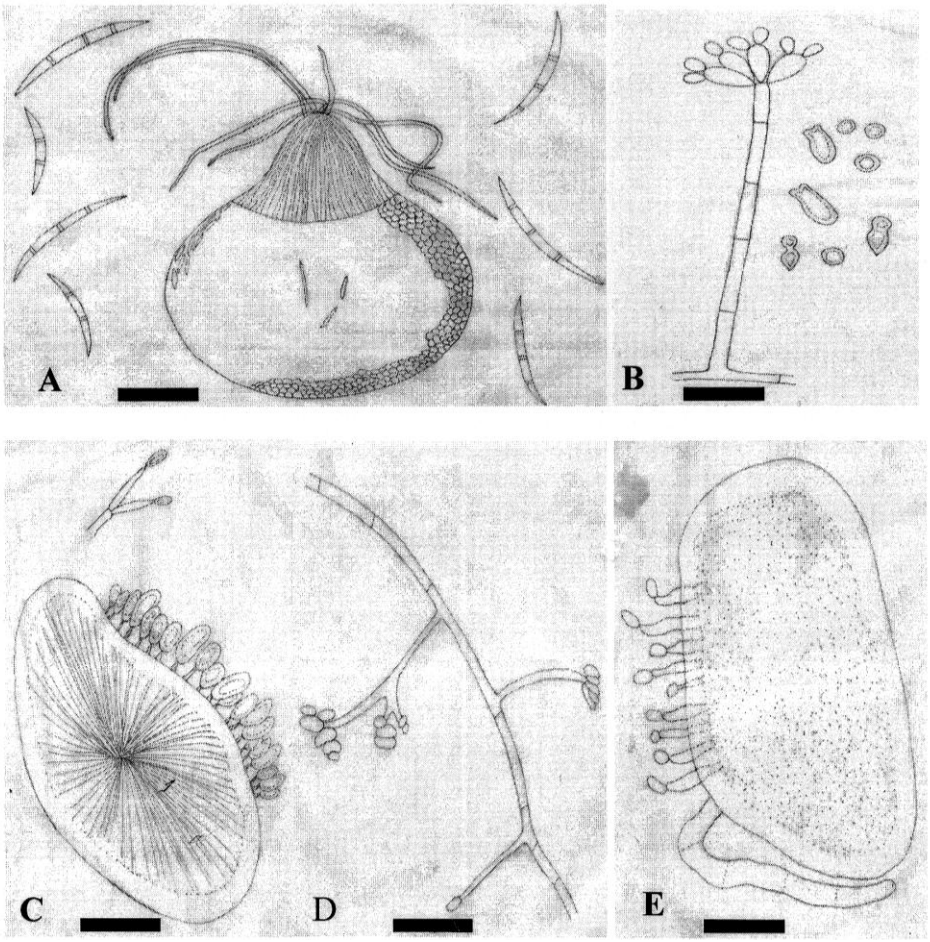

Fig. 1. A–E. Lucida drawings of fungal propagules. (A) Pycnidium and Conidia of *Aristatoma oeconomicum* (B) Conidia and Conidiophore of *Hyalodendron pirinum* (C) Sporodichia and Conidia of *Kutilakesopsis macalpineae* (D) Conidia, Conidiophores and mycelium of *Cephalosporium coremioides* (E) Acervulus and Conidia of *Gleosporium nervisequum*. Scale bar for A= 5µm, B= 7.5 µm, C= 20 µm, D& E= 10 µm

Remarks: This fungus has been already reported as saprophyte and parasites mostly on wood (Barnett & Hunter, 2003). For Pakistan it is a new record.

***Kutilakesopsis macalpineae* [Plate 1D., Fig. 1C]**

Sporodochia immersed in substratum, green, hypophyllous as black scattered spots, cushion-shaped with setae; 71 µm long and 98 µm wide; setae brown, wavy, blunt. Conidia circular to oval, 10–17 x 6–7 µm, single celled, hyaline, non-septate, developed on phalides. Phialides long slender.

On *Furcraea gigantea*, as black circular spots., Punjab University Floriculture Research Farm, Q.A. Campus, Punjab University, Lahore, 27.8.2005.

ERM # 27805, Punjab University Herbarium, Lahore, Pakistan.

Remarks: This fungus has been already investigated as saprophyte on plant materials (Barnett, 1960). It is an addition to our fungal flora.

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