



***Eurotium rubrum* W. Bremer an Ascomycetous Fungus Isolated from *Gerbera aurantiaca* L. in Bangladesh**

S. Shamsi* and F. Yeasmin

Department of Botany, University of Dhaka, Dhaka 1000, Bangladesh

*Corresponding author's e-mail: prof.shamsi@gmail.com

Abstract

A study was conducted to identify the fungi associated with phylloplane of *Gerbera* spp. belongs to the family Asteraceae. During the period of this study an ascomycetous fungus was isolated from healthy leaves of *Gerbera aurantiaca* L. Leaf samples of *G. aurantiaca* were collected from Botanical garden, University of Dhaka during the month of February 2012. "Tissue Planting" method was followed for isolation of fungi using PDA medium. The fungus was identified as *Eurotium rubrum*.

Keywords: *Eurotium rubrum*, *Gerbera aurantiaca*, Ascomycetes, Bangladesh

Eurotium species are saprophytic and represent some of the most catabolically and anabolically diverse microorganisms. Some species are xerotolerant or osmotolerant, some are psychotolerant and thermotolerant. These properties, combined with the ability to produce diverse sets of toxic secondary metabolic such as aflatoxins, ochratoxins and patulins, make these fungi important agents of food spoilage (Geiser, 2006).

Eurotium is one of the teleomorph of the genus *Aspergillus*. Teleomorph of *Aspergillus* species are considered to belong to different genera of family Tricomaceae of the order Eurotiales, class Eurotiomycetes (Peterson *et al.* 2008), phylum Ascomycota (Webster and Weber, 2007). Recent revisions of the Botanical Code have increasingly shown the advantage of the sexual names over the asexual names. By identification *Aspergillus* is a name referring to the asexual phase and therefore, according to current rules of nomenclature, any *Aspergillus* with a sexual

stage (teleomorph) no longer should be called *Aspergillus* (Baker and Bennett, 2008; Machida and Gomi, 2010). Occurrence of *Eurotium rubrum* W. Bremer in Bangladesh has not yet been reported.

A study was conducted to identify the fungi associated with phylloplane of *Gerbera* spp. belongs to the family Asteraceae. During the period of this study *E. rubrum* was isolated from healthy leaves of *Gerbera aurantiaca* L. Leaf samples of *G. aurantiaca* were collected from Botanical garden, University of Dhaka during the month of February 2012. "Tissue Planting" method was followed for isolation of fungi using PDA medium (Anonymous, 1968). *Alternaria citri* Ellis & Pierce apud Pierce, *Aspergillus flavus* Link, *Aspergillus niger* van Teighem, *Aspergillus terreus* Thom, *Bipolaris hawaiiensis* (Bugnicourt ex MB Ellis) Uchida et Aragaki, *Cladosporium cladosporioides* (Fresen.) de Vries, *Colletotrichum dematium* (Pers. ex Fr.) Grove and *Pestalotia* de Not. were found to be associated with the healthy leaf samples of *G. aurantiaca*. Along with the

above fungi an unknown species of *Eurotium* was isolated from the *Gerbera* leaves. Morphological characters of the fungus were recorded on PDA. The fungus was grown on 90 mm sterilized petriplates on PDA medium at temperature 25 ± 2 °C and pH 6.0. Species was identified based on specific keys described by Raper and Fennell (1965) and Yazdani *et al.* (2011). *Eurotium rubrum* was isolated and identified from *G. aurantiaca* that has not been reported from Bangladesh. Colonies of the fungus was light yellowish, cottony, reverse orange red on PDA medium. Hyphae pale to mid brown, smooth, septate, branched, 1-4 μ m diameters. Cleistothecia superficial, yellow to light brown, globose to subglobose 70-250 μ m, Asci 8 spored, 8-15 \times 8-12 μ m, Ascospores 4-7 \times 5-6 μ m. Conidia subglobose to globose 5.2-6 μ m (Plate 1. A-D). A simplified differentiation key based on microscopic characteristics was used in this study for determining species. A comparative study of present isolate of *E. rubrum* with other isolates and IMI description of the fungus is presented in Table 1.

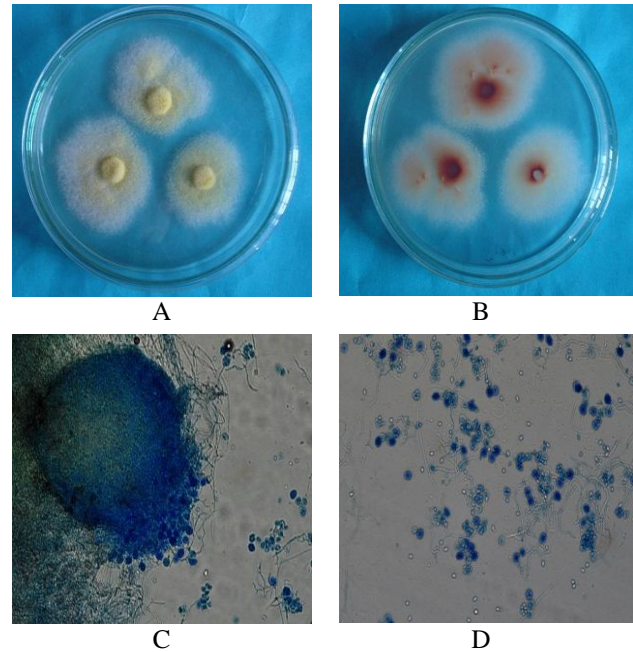


Fig our 1. *Eurotium rubrum* : A. dorsal view of the culture plate, B. ventral view of culture plate, C. cleistothetium and D. conidia of perfect sage of *E. rubrum*. (Bar = 50 μ m)

Table 1. Morphological characteristics of the isolates of *Eurotium rubrum* and the isolate GA 30-12.

Characters
1. IMI descriptin: Colony orange red to ferruginus, Cleistothecia orange red or yellow, spherical, 80-120 μ m. Asci globose to subglobose, 10-12 μ m. Ascospore orange red, yellow, ellipsoidal, lenticular, 5.2-6 \times 4.4-4.8 μ m. Conidia ovate, barrel shaped 5.0-7.5 μ m long.
2. DKV00I: Colony orange red. Cleistothecia yellow to light brown, globose to subglobose, 40-75 μ m. Asci globose to subglobose, 8-11 μ m. Ascospore yellow disciform, 4.0-05 \times 4.2-4.5 μ m. Conidia ovate, 4.6-6.0 \times 3.0-4.3 μ m.
3. König 1901: Colony yellow to light orange, Cleistothecia picric yellow to buff yellow, reverse cinnamon buff, globose to subglobose, 80-145 μ m. Asci globose to subglobose, 10.8-16.7 \times 10-15 μ m. Ascospore lenticular 5.0-7.1 \times 4.0- 5.8 μ m. Conidia subglobose, globose, elongated spinose or spinolose, a narrow to broad furrow and two distinct ridges with convex surface walls. 4.6- 8.0 \times 5.0-7.5 μ m.
4. MZKI A-563: Colony yellowish to orange red. Cleistothecia orange red, globose to subglobose 117 \pm 7 \times 102 \pm 7 μ m. Asci globose to subglobose, 13.1 \pm 1.8 \times 10.5 \pm 0.4 μ m. Ascospore 5.2 \pm 0.2 \times 4.2 \pm 0.1 μ m. Conidia ellipsoidal, 6.3 \pm 0.2 \times 5.8 \pm 0.02 μ m.
5. UPMC A14 and UPMC A17: Colony pale grey green, Cleistothecia abundant, orange red to red. Ascospore smooth or nearly \leq 6 μ m.
6. GA30-12: Colony of the fungus was light yellowish, cottony, reverse orange red. Cleistothecia superficial, yellow to light brown, globose to subglobose, 70-250 μ m, Asci with 8 ascospores. 11- 15 \times 10 -13 μ m, Ascospores 4-7 \times 5-6 μ m. Conidia subglobose to globose 4-5 \times 5-6 μ m.

Data isolate 1. Kozakiewiez (1995), 2-3. Yan *et al.* (2009), 4. Butinar *et al.* (2005) and Yazdani *et al.*, (2011) and Mycobank (<http://www.mycobank.org/MycoTaxo.aspx>)

Colony characters, description of asci, ascospore and conidia of the isolate GA30-12 is very near to other isolates studied but cleistothelial size is larger than previously described isolates of *E. rubrum*. The fungus did not produce conidiophores and vesicle in culture medium within 4 weeks of observation.

So far, *E. rubrum* has been isolated and described on milled rice samples and meju (Yazdani *et al.*, 2011; Hong *et al.*, 2011). The fungus has been also isolated from saline habitat (Butinar *et al.* 2005). This is the first report of association of *E. rubrum* with *Gerbera* sp. as well as this is the first report of the fungus from Bangladesh.

REFERENCES

- Anonymous . 1968. In: *Plant Pathologist's pocket Book*. Commonwealth Agricultural Bureau (CAB), Commonwealth Mycological Institute, Kew, Surrey, England, pp. 1-267.
- Baker, S.E and J.W. Bennett. 2007. An overview of the genus *Aspergillus*. In: *The aspergilli: genomics, medical aspects, biotechnology, and research methods*. CRC Press, NY, USA. pp. 3-13.
- Butinar, L., P. Zalar, J.C. Frisvad and N.G- Cimerman. 2005. The genus *Eurotium*-members of indigenous fungal community in hypersaline waters of saltners. *FEMS Microbiol. Ecol.* 51: 155-166.
- Geiser, D.M., C. Gueidan, J. Miadlikowska, F. Lutzoni, F. Kauff, V. Hofstetter and E. Fraker. 2006. Eurotiomycetes: Eurotiomycetidae and Chaetothyrionomycetidae. *Mycologia.* 98:1053-1064.
- Hong, S.B., D.H. Kim, M. Lee, S. Y. Baek, S. W. Kwon and R.A. Samson. 2011. Taxonomy of *Eurotium* species isolated from meju. *J. Microbiol.* 49:669-674.
- Kozakiewicz, Z. 1995. IMI descriptions of fungi and bacteria no. 1256. *Mycopathologia.* 132:53-54.
- Machida, M. and K. Gomi. 2010. In: *Aspergillus: Molecular Biology and Genomics* (edited). Caister Academic Press. 238.
- Peterson, S.W., J. Varga, J.C. Frisvad, R.A. Samson. 2008. Phylogeny and Subgeneric Taxonomy of *Aspergillus*. In: *Aspergillus in the Genomic Era*, Varga, J. and Samson, R. A., Eds., The Netherlands: Wageningen Academic, 2008, pp. 33-56.
- Raper, K.B. and D.I. Fennel. 1965. *Aspergillus glaucus* group. In: *The genus Aspergillus*. Baltimore, Williams & Wilkins Company, USA. pp. 147-196.
- Webster, J and R. Weber. 2007. *Introduction to fungi*. Cambridge University Press. NY. p. 669.
- Yazdani, D., Z.A.M. Ahmad, T.Y. How and A. Qaderi. 2011. Isolation and identification of *Eurotium species* from contaminated rice by morphology and DNA sequencing. *Inter. J. Mol. Clin. Microbiol.* 1:97-102.
- Yun, Y. H., M. W. Hyun, D. Y. Suh, Y. M. Kim and S. H. Kim. 2009. Identification and characterization of *Eurotium rubrum* isolated from Meju in Korea. *Mycobiology.* 37: 251-257.