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Study on Some Biomorphological Peculiarities of *Alternaria Tenuissima* (Kunze) Fungi Isolated from *Tamarix Hispida* Willd

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Abstract: ***Tamarix hispida samples collected on 2017-year expedition to the dried-up part of the Aral Sea former bottom were used for the mycological examination. The morphology of conidia and mycelium on various nutritional media, such as Potato Dextrose Agar (PDA) and Potato Carrot Agar (PCA) was examined. As the result, the taxon belonging of the fungi isolated from Tamarix hispida was determined. They were identified as Alternaria tenuissima hyphomycete.***

Keywords: alternaria blights, *Alternaria tenuissima*, hyphomycete, mycological examination, nutritional medium, saprotroph

1. Introduction

The alternary fungi are widely available in the nature. Most of them are saprophytes able to develop on any organic matter. Plants entering a moribund state and plant residues the fungus falls on the soil from serve as the reservoir for the alternary fungi. Together with other fungi, the alternaria is involved in the decomposition and mineralizing of the plant residues. Enormous variety of enzymes found in saprophyte alternary fungi contributes to the process.

The saprophyte alternary fungi with highly active polygalacturonase are known to make the pickled cucumbers soften and to degrade rutin, a glycoside, in the skin of an apple, as well as in the leaves of tea, tobacco and other plants making them marigold yellow.

Ample enzymatic apparatus of the fungus contributes to amplitudinous adaptation and ability to subsist in a variety of existence conditions. Easy distribution of light spores provides a great capacity for dispersal too. Thes pores of alternary fungi, and sometimes, spore chainscan be found in air masses everywhere in the places plants grow.

Plant pathologists and plant protection workers are fully aware of the alternaria blights affecting the cultivated, wild and weed plants. Damage of plants by microscopic fungi imperfecti of the *Alternaria* genus is a cause of the alternaria blights. The species of the genus are widely spread worldwide. While some of them are harmless saprotrophs, the other ones, parasitic fungi cause noxious crop diseases (Gannibal, 2011a).

Previously designated as the fungi imperfecti (*Hyphomycetes* class, *Dematiaceae* family), according to the system acknowledged today, the *Alternaria* genus is thought to be an anamorph of the ascomycetes (*Pleosporaceae* family, *Pleosporales* order, *Pleosporomycetidae* subclass, *Dothideomycete* sclass) (Kirketal, 2008). Some *Alternaria* species are known to have ateleomorph from the *Lewia* genus, but the great majority of the species have lost it (Rotem, 1994).

Alternaria-like hyphomycetes include 10 genera with total sum of 350 species to be represented by *Alternaria* (nearly 280 species), *Alternariaster* (1 species), *Brachycladium* (2 speciesa), *Chalastospora* (1 species), *Embellisia* (23 species), *Nimbya* (17 species), *Prathoda* (1 species), *Teretispora* (1 species), *Ulocladium* (24 species), *Undifilum* (2 species) (Gannibal, 2011b).

The findings from study on the mycobiota of plants from different families demonstrated that *A.tenuissima* is the most frequent among the sporidiums, while *A.alternata* (in a strict sense) is less common (Gannibal, 2011a).

The *Alternaria* spores can cause allergic reactions, rhinitis and acute lethal exacerbations of the bronchial asthma (Gannibal, 2011b).

2. Materials and Methods

Good *Tamarix hispida* samples collected on 2017-year expedition to the dried-up part of the Aral Sea former bottom were the materials for examination. The identification of cultures was performed when sufficient number of mature conidia was formed in the isolates, (on 5-9th day), but sometimes the microscopy had to be continued afterwards. The habitus of sporulation was the first to analyze. When the well-developed sporulation appeared, conidia preparations were made for the microscopy (Gannibal, 2011b).

Mathematical processing of the conidia measurements was performed by the method of Dospekhov (1979). Classical methods were used to prepare the media (Booth, 1971). Identification guide by Gannibal (Gannibal, 2011b) was used to determine the fungi taxon belonging. Surface

sterilization of plant samples for phytopathological (mycological) examination was performed by the method of Khasanov and Glukhova (1992). The 2-3mm-long fragments of samples were washed off in the inert material sample containers under a running tap water for 2 hours; the containers were subsequently placed into Petri dishes with the distilled water and: a) Tween-80 detergent (0.002%) for 30s, b) 0.5% solution of sodium hypochlorite for 30s, c) 50% ethanol for 30s. All samples were rinsed in the sterile distilled water thrice for 1 min.

The samples were dried and put into various agar media, such as Potato Dextrose Agar (PDA), Potato Carrot Agar (PCA) and starvation agar (SA). The inoculated Petri dishes were exposed in the climate chamber with 12-hour photoperiod at 24-25°C in daytime and 20-21°C at night or at other temperatures favorable for generative structures' formation.

3. Results and Discussion

The colonies were examined under microscope starting from the 3-day age. The identification was performed after the isolates had formed sufficient number of mature conidia, that is, on the 5-9th day, but not infrequently the microscopy had to be continued afterwards. To examine appearance of the sporulation, the Petri dish with the fungi culture was placed under microscope with magnification level either of 50x or 100x.

It is of importance to record the sporulation habitus of the sporidiums at the initial stages of sporulation. For instance, *A. tenuissima* was found to form simple long spore chainson the 3-7th day of growth. But afterwards the chains start branching out to resemble other species, such as *A. longipes*, *A. alternata*or others with chains branching out immediately (Gannibal, 2011b).

Small conidia were 25-55x7-17 µm, infrequently longer due to the secondary conidiogenous cell. Large conidia were longer or thicker. Usually, their length exceeds 60µm to be 100-300 µm more frequently, of which the body length is 50-130 µm with processes not taken into account; their thickness is 12-35µm (Table 1).

Table 1: Conidia of *Alternaria tenuissima* isolated from *Tamarix hispida* (on the Potato Carrot Agar)

Fungus	Place of plant collection	Length of conidia, µm	V	S_x%	Width of conidia, µm	V	S_x%
Alternaria tenuissima	dried-up part of the Aral Sea former bottom	$45.9^{\pm 0.5}$	6.2	0.70	$15.4^{\pm 0.7}$	12.7	4.6

If the conidia were short (up to 60 µm), they were wide (15-26 µm). The size of the egg-shaped, cylindrical or inversely club-shaped conidia of dark brown color at the apex with the light brown secondary conidiogenous cell ranged from 5 to10 µm (less frequently up to 35 µm); the conidia form simple or branched out long chains (6-12 conidia in a row).

In 5-30% of the elliptic, egg-shaped or club-shaped conidia, brownish or of light brown color, the secondary conidiogenous cell is long measuring up to 20-60 (100 µm); the conidia form branching out bush-like chains of various lengths (Figure 1, 2, 3, 4).

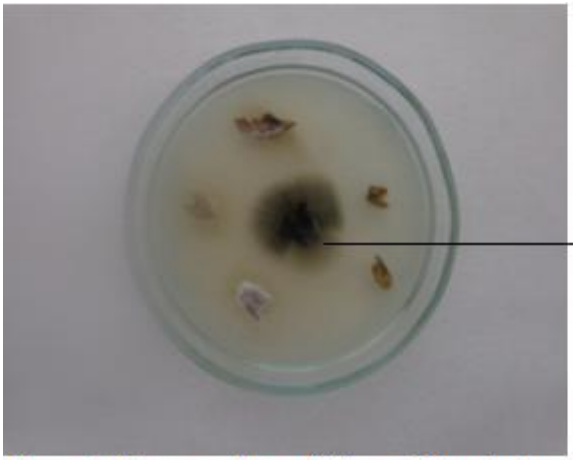

Figure 1: Primary culture of *Alternaria tenuissima*

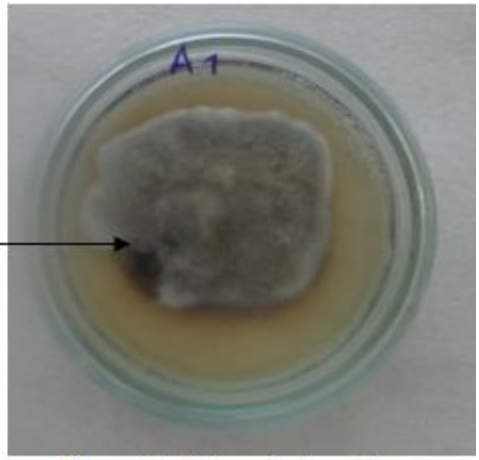

Figure 2: *Alternaria tenuissima*

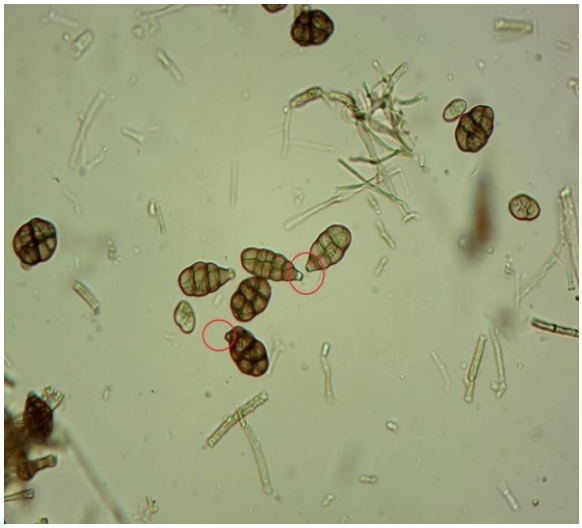

Figure 3: *Alternaria tenuissima* conidia (x400)

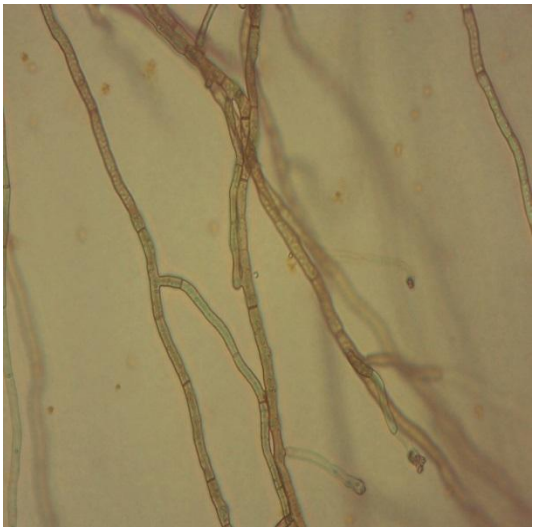

Figure 4: *Alternaria tenuissima* mycelium (x400)

Thus, the roots and stalks of good *Tamarix hispida* collected on the expedition to the dried-up part of the Aral Sea former bottom (August and September-October of 2017). The morphology of conidia and mycelium on various media, such as Potato Dextrose Agar (PDA), Potato Carrot Agar (PCA) was examined. As the result, the taxon belonging of the fungi isolated from *Tamarix hispida* was determined. They were identified as *Alternaria tenuissima* hyphomycete.

Thorough study on *Alternaria tenuissima* affecting quality of essential crops in Uzbekistan is to be continued. The study was conducted on the site of special scientific interest, a collection of phytopathogenic microorganisms including isolated cultures to be stored and examined.

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