PHOMOPSIS CANCKER AND DIEBACK OF *ELAEAGNUS ANGUSTIFOLIA* L. FROM THE SPONTANEOUS FLORA OF IASI COUNTY, ROMANIA

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Abstract

Russian olive (*Elaeagnus angustifolia* L.) started to be regarded in the last time more as a very useful multipurpose tree species with a high potential for forest land reclamation, rather than a dangerous invasive one. In the perspective of contemporary climate change, characterized by higher temperatures and lower rainfall, Russian olive trees could gain more attention from foresters, ecologists and land managers who should develop an integrated management plan for this species. Nevertheless, due to one of the most serious diseases of *Elaeagnus angustifolia* L., that is caused by the fungus *Phomopsis elaeagni* Sandu. (1962) also phytopathologists attention and interest must be increased regarding the Russian olive trees. The disease symptoms were observed in May 2024 on the several branches of *Elaeagnus angustifolia* L. trees from a spontaneous flora area of Iasi county, Romania. The primary aim of the present study was to identify and at the same time to signal the presence of *Phomopsis elaeagni* fungus on the Russian olive tree in the mentioned area. In order to confirm the field diagnosis observed several laboratory determination were made, so the fungus can be identified and morphological described.

Key words: *Phomopsis elaeagni, fungus occurrence, Elaeagnus angustifolia*

Elaeagnus angustifolia L. (oleaster, Russian olive) is a small tree or large multistemmed shrub, member of the *Elaeagnaceae* family, which contains three genera (*Elaeagnus, Sheperdia, Hippophae*) and arround 80 species (Patel S., 2015). Species of *Elaeagnus* genera is widespread from north Asia and Himalaya to Europe being otherwise originating from Eurasia (Torbati M. *et al*, 2016). At the end of the XIX *Elaeagnus angustifolia* L. was also introduced in North America at the end of the XIX century as species used in fields affected by landslides or erosion or in horticulture. *Elaeagnus angustifolia* L. shows also some pharmacological and therapeutic effects, different parts of the plant species, especially fruits being used in the traditional medicine (Farzaei H.M., 2015; Hamidpour R., 2017).

In Romania, *Elaeagnus angustifolia* L is found predominantly as naturalized stand in steppe forest covers, on marine sands and on saltings (seashore, Danube Delta or along the other rivers), and primarly has a major ecologic purpose in fixing and improving unstable fields (ravines, shores, cloughs) or in preventing weeds and grazing (Dincă L., Timiș-Gânsac V., 2020).

Due to a synonymization following the one-fungus-one name paradigm linked both individual groups together, with the older name *Diaporthe* has receiv priority over *Phomopsis* (Rossman *et al*, 2015). Based on recent nomenclature changes (e.g. One fungus, One name), according to EPPO Global Database the name *Phomopsis* is considered a synonym of *Diaporthe.* Among disease symptoms causally linked to *Diaporthe* infections are leaf spots, cankers, dieback and fruit rots as well as decays and wilt (Guarnaccia *et al*, 2018).

Besides the fact that members of the genus *Phomopsis* (syn. *Diaporthe*) are most well-known as phytopathogens in agriculture and for the economically impactful through infections of grapevines, forest trees and plants of ornamental value their ubiquitous dispersion are conceivably among the main reasons why *Diaporthe* and the former *Phomopsis* spp. are studied extensively also for their capability to produce bioactive natural products (Xu *et al*, 2021).

In Romania, *Phomopsis elaeagni* was first mentioned by Sandu-Ville C., in 1962 (Bontea V., 1985). Due to the importance of the Russian olive tree for the foresters, ecologists and land managers knowing the occurrence and distribution of *Phomopsis elaeagni* the causal fungus of cancker and dieback of *Elaeagnus angustifolia* L. is also needed.

MATERIAL AND METHOD

The occurrence of the *Phomopsis* cancker and dieback on *Elaeagnus angustifolia* l. tree reported trough this article was observed in May 2024, to some Russian olive trees from a naturalized stand located in Rediu Aldei village at 4 km away from Aroneanu commune, Iasi city,

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Romania, GPS Coordinates: www. google.com/maps, accessed on May 2024, 47°14'17"N 27°38'02"E (*figure 1*).

Figure 1. **A natural habitat of *Elaeagnus angustifolia L.* located in Rediu Aldei village, Aroneanu commune of Iasi city, Romania. Blue mark represent the exact location of the plant material investigated. Red x marks the physical location of the plant tree.**

Branches of *Elaeagnus angustifolia* L. that presented perennial cankers observed in spur positions, cordons, and/or trunks were collected and investigated in the research laboratory of the phytopathology discipline within the "Ion Ionescu de la Brad" Iasi University of Life Sciences (IULS). After a putative micromycete identification based on visual symptoms, fungal morphology, as described by Rnold R.H and Straby A. E. (1973) or other specialized scientific guidance, we followed a standard procedure for fungal isolation in order to confirm the presence of *Phomopsis elaeagni* (syn *Diapothe elaeagni*) on *Elaeagnus angustifolia* L. (Úrbez-Torres J. R., *et al,* 2006). Forwards, infected tissues of Russian olive that showed characteristic dieback symptoms were cut into small pieces and then rinsed 3~4 times with diluted water after being treated with 70% (v/v) ethanol for 2~3 s. The treated tissues were transferred to potato dextrose agar (PDA) medium and cultured at 25 °C in order to isolate the fungus.

RESULTS AND DISCUSSIONS

Environmental conditions registred in the spring of 2024 showed to be favorable for *Phomopsis elaeagni* occurrence on Russian olive (*Elaeagnus angustifolia* L.) from a natural habitat situated in Rediu Aldei village, Aroneanu commune of Iasi city, Romania. Symptoms were first observed as a wilting of brances and twings of the Russian olive tree. Leaves on the infected branches become dry, turn tan and remained attached during all the growing season (*figure 2*).

Figure 2. **Wilted branches of the Russian olive tree affected by *Phomopsis* cancker (original).**

On branches smaller, around one centimeter in diameter infected bark remained smooth and becomes reddish brown or orange with dark brown margins. On larger branches canckers becomed sunken and rough textured. Cankers ranged from 2- 15 cm long but those of 2-10 cm prevailed. Sapwood beneath cancker were brown with discolored areas extended to a short distance outside the margins of diseased bark. *Phomospis elaeagni* developed on beneath the branches bark of *Elaeagnus angustifolia* and formed numerous black pycnidia, pinhead-sizead pimples, pushed thorugh the bark and roughen the canker surface (*figure 3*).

Pycnidial stromata of *Phomospsis elaeagni* formed in the bark of infected stems and branches becoming erumpent, subspherical, with closely adhering bark, less than 1 mm diameter, around 800 µm diameter and about 500 µm high, very numerous (*figure 4, a*).

Conidiophores (phialids) had a cylindrical shape, slightly inclined or occasionally branched once near the base (*figure 4, b*).

Figure 3 ***Phomopsis elaeagni*** **cancker on host plant branches of** ***Elaeagnus angustifolia*** **L. (original)**

In the pycnidial stromata on the host were found only alpha conidia, ellipsoidal, fusiform, sometimes more conical at one end, straight or slightly curved, hyaline, single (*figure 4, c*).

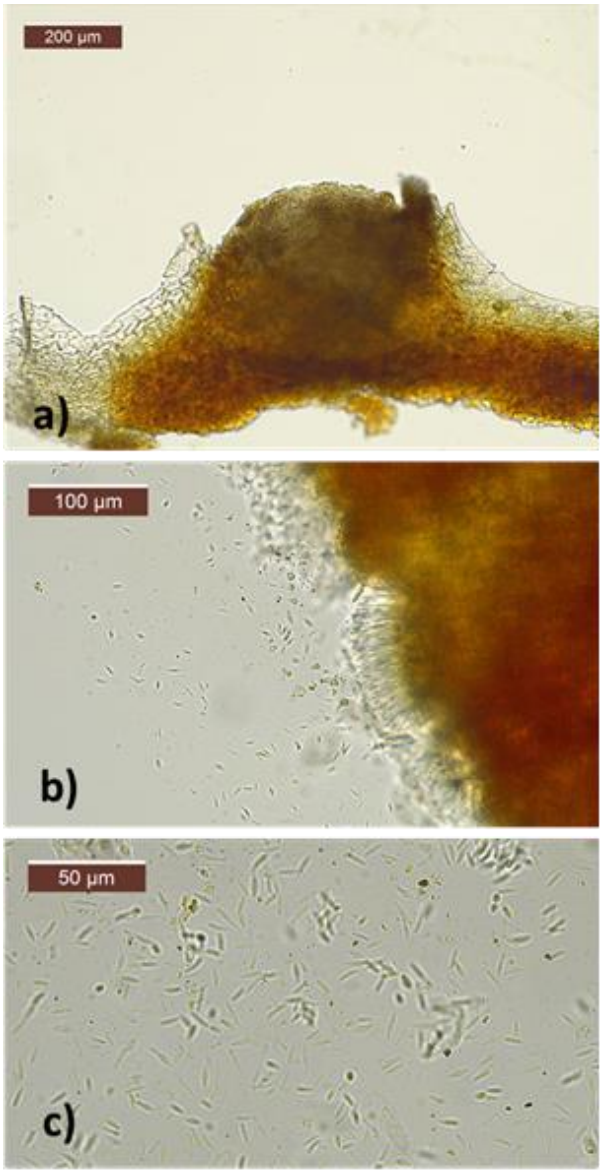

Figure 4 ***Phomopsis elaeagni:*** **a), b), sections trought picnidiol stomata; c) alpha conidia (original)**

The *Phomopsis* fungus can overwinte in cankers as mycelium and pycnidia. Conidia are produced in large numbers during extended periods of wet weather and usually are spread by insects, splashing water, or mechanically by man. Primarlly path of entry into healthytree tissue is through bark wounds, branch stubs and damaged thorns. The fungus is virulent and can infect Russian olive trees of all sizes throughout the growing season.

CONCLUSIONS

Considering the severity of the symptoms described, *Phomopsis elaeagni* (syn. *Diapothe elaeagni*) is an aggressive pathogen that can attack vigorous trees and it is also a serious threat to young nursery-grown Russian olive trees as well as toolder trees in ornamental plantings.

Even if the genus *Diaporthe* recieved priority over *Phomopsis* and is a group of fungi frequently reported as phytopathogens, their importance for agriculture and biotechnology attracts constantly the interest of taxonomists and natural product chemists alike in context of plant protection and exploitation for their potential to produce bioactive secondary metabolites.

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