CONTRIBUTION TO THE KNOWLEDGE OF THE MICROMYCETES FROM THE SPONTANEOUS FLORA IDENTIFIED IN IASI COUNTY REGION, ROMANIA

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Abstract

Permanent knowledge of distribution, diversity and interactions between organisms, plants and the environment in which they live is extremely important for the conservation of biodiversity. Interest for biodiversity conservation is intensified by concern bout the conservation of genetic resources, destruction of forest, extinction of species and the effects of global warming. This paper presents some parasitic micromycetes identified on plant species from different areas of Iasi County. In our fieldwork made in the spring of 2021 year were indentified some parasitic micromycetes to spontaneous flora species as: fumewort (*Corydalis solida* L. Clairv.), alpine squill (*Scilla bifolia* L.), buttercup anemone (*Anemone ranunculoides*), lesser celandine (*Ranunculus ficaria* L.) și snake's head fritillary (*Fritillaria meleagrioides* Patrin ex Schult. & Schult. f.) Identified micromycetes cause some plant diseases as downy mildew or rust and this fungi species belong to some different taxonomy: Those who cause downy mildew are from *Oomycetes* class, and rust are from *Teliomycetes* class as *Tranzschelia*, *Puccinia.*și *Uromyces* genera.

Key words: mycoflora, vascular plants, enviorement, biodiversity

Micromycetes is a group of eukaryotic, heterotrophic, ubiquitous organisms, with numerous species that have varied biological structures and characters, adapted to the saprophytic, parasitic or symbiotic way of life (Ulea E., Lipșa F.D., 2011). The number of known micromycete species is about 100,000, of which about 15,000 are parasitic species in the sens that can cause plant diseases. (Gonzales-Fernandez R. *et al*, 2010). The number of micromycete species worldwide is estimated as being over 1.5 million species in the conservation stage. This estimate is mainly based on reports of vascular plants and micromycetes in different regions and the stage is considered conservative because: worldwide estimates of vascular plants are low, reports of vascular plants and micromycetes are based on myological areas still unknown, reports from major tropical and polar regions are not taken into account (Hawksworth D.L., 1991).

Knowledge of specific micromycetes and their spread in a certain area helps to provide good guidance to those interested, in the sense of combat through effective methods the parasitic micromycetes that can cause diseases in crops and not only. In Romania, around 1985 were known a number of 8727 species of macro- and micromycetes (Bontea Vera, 1985). Today, the number of these micromycetes at national level it is certainly higher, but the reports of the new species identified it is not done in a centralized way but only in various specialized magazines, both national and international.

MATERIAL AND METHOD

Observation have been conducted according to an itinerary from two different areas of Iași County, durind the months March - May of 2021. A first area in which were made observations is located in the Northern part of the Cotu Morii village, from Popricani commune, Iasi county (Coordonate:www.google.com/maps: 47°18′14″N 27°33′0″E). The other area in which were made observations is located in Aroneanu commune, also from Iasi county (Coordonate:www.google.com/maps 47°12'59.5"N 27°37'36.2"E).

Identified host plants were collected and brought to the research laboratory of the Phytopathology discipline, within the "Ion Ionescu de la Brad" Iasi University of Life Sciences (IULS). Micromycetes identification was done based on microscopic preparations and specialized guide book, after that micromycetes were included in Herbarium Mycologicum Moldavicum" C. Sandu Ville."

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RESULTS AND DISCUSSIONS

Following the observations, two *Peronospora* species wich produce downy mildew to plants from various botanical families have been identified :

Peronospora corydalis de Bary was identified on *Corydalis solida* (L.) Clairv. plants. *Corydalis solida*, known as the fumewort, that is a species of flowering plant in the family *Papaveraceae*. On this plants an initial symptom of leaf infection was observed like a yellowing or chlorosis. As the pathogen develops, a purplish down of conidiophores and conidia becomes apparent on the lower leaf surface. Systemic infections with *Peronospora corydalis* de Bary results in stunted growth, producing shorter plants with smaller leaves that are chlorotic and often curled (*figure 1*).

The morphology of conidiophores, conidia, and oospores from symptomatic plant tissue was examined. Infected fresh leaf material from *Corydalis solida* (L.) plant was mounted in lactophenol for observing conidiophores and conidia.

Figure 1 **Downy mildew of fumewort caused by *Peronospora corydalis* de Bary.**

Peronospora ficariae (Ness v. Essenb.) Tul. was identified on *Ranunculus ficaria* L. plants that are known as lesser celandine or pilewort. Is a low-growing, hairless perennial flowering plant in the buttercup family *Ranunculaceae*. Symptoms were characteristic of those associted downy mildew on *Coridalis solida* (L.), leaf infection was observed like smaller leaves that are chlorotic and often curled (*figure 2*).

Infected fresh leaf material had only conidia and conidiophores present, wich were observed on the underside of leaves.

Figure 2 **Downy mildew of lesser celandine caused by *Peronospora ficariae* (Ness v. Essenb.) Tul.**

Conidiophores are erect, hyaline with straight trunck, branches of conidiophores arise from the main axis in up to seven orders, and ultimate branchlets are straight to curved and have pointed tips. Conidia are ovoid to elipsoidal, 14-33 µm long and 11-29 µm wide (*figure 3*).

Figure 3 **Morphological features of *Peronospora ficariae* on *Ranunculus ficaria* L.**

As for the rust fungi *(Uredinales*) group have been identified the following micromycetes:

***Tranzschelia pruni-spinosae* (Pers.)**, Syn. *Aecidium puctatum* Pers. on *Anemone ranunculoides* L., a species of herbaceous perennial plant that grows in forests, known as yellow wood anemone, or buttercup anemone. Also, *Anemone ranunculoides* L. is a hosts of pycnidial and aecial stadium of *Tranzschelia pruni-spinosae* and *Tranzschelia discolor (figure 4)* which produces rust of the stone fruits.

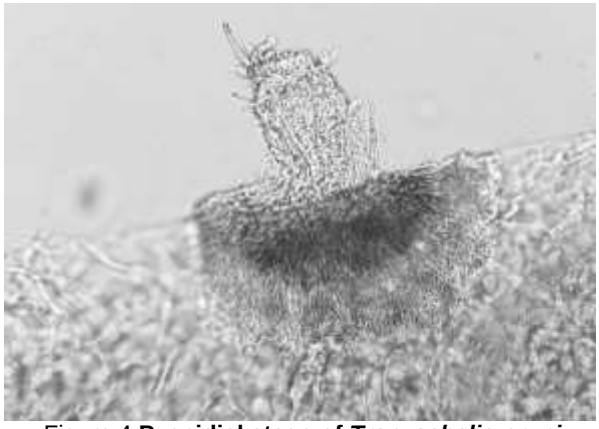

Figure 4 **Pycnidial stage of *Tranzschelia pruni-spinosae* (Pers.)**

Infected plant are paled and grow stiffly upwards; the leaves are narrowed (*figure 5*). Also, on infected leaves of *Anemone ranunculoides* L. were observed numerous light brown aecidia, dispersed over the entire underside of the leaf; they are cupulate and split in a few slips, curled outwards.

Figure 5 ***Anemone ranunculoides* L .- infected plants with *Tranzschelia pruni-spinosae* (Pers.)**

***Uromyces ficariae* (Schum) Lév.**, on *Ranunculus ficaria* L. leaves produce aecia in compact groups (*figure 6*), up to 20-50 together with spores about ± 3 µm large, slightly flattened, easily detachable appendages.

Figure 6 **Rust of lesser celandine on *Ranunculus ficaria* L.**

Puccinia rossiana (Sacc.) Lagh., Syn. *Puccinia liliacearum* Duby ssp. *rossiana* Sacc. on *Scilla bifolia* L. a herbaceous perennial plant belonging to the genus *Scilla* of the family *Asparagaceae* known as alpine squill or two-leaf squill. On infected plants teliospores are formed in large groups around the leaf tip, dark brown colored (*figure 7*).

Figure 7 **Rust of alpine squill on *Scilla bifolia* L.**

Puccinia rossiana (Sacc.) Lagh forms two-celled teliopores, all with many small but clear pits, also they have pore of the apical cell with an acute papilla (*figure 8*).

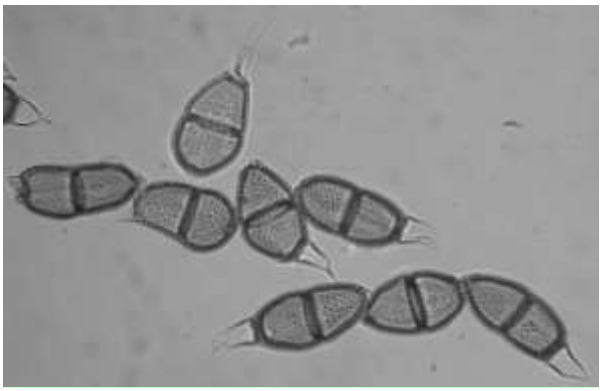

Figure 8 ***Puccinia rossiana* (Sacc.) Lagh – teliospores**

Uromyces lilii (Link.) Fuck. on *Fritillaria meleagrioides* Patrin ex Schult. & Schult. f., that is a rare species recently reported in the Romania's vascular flora (Sârbu C. *et al*, 2019). First report of the species *Fritillaria meleagrioides* Patrin ex Schult. & Schult. f., in the northen part of Cotu Morii village (Popricani commune, Iasi) was in the year of 2015 (Oprea A. *et al*, 2015).

Uromyces lilii (Lk.) Fuck were identified on *Fritillaria meleagrioides* in april of 2021. Infected plants showed on stem, petiole and leaves pale yellow amphigenous aecia, opening with a central pore (*figure 9*).

Figure 9 **Aecia of *Uromyces lilii* on *Fritillaria meleagrioides***

Aeciospores are spherical, subspherical, angular spherical or elongated, with a yellow washed almost colorless membrane that presents dense and fine protuberances (*figure 10*).

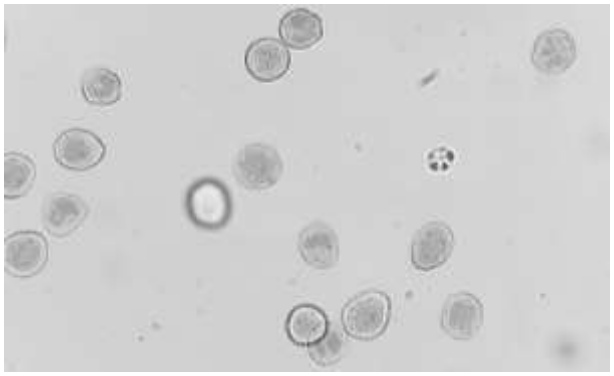

Figure 10 **Aeciospores of *Uromyces lilii***

From our knowledge, *Uromyces lilii* (Link.) Fuck is cited in our contry only on two other different *Fritillaria* species such as *F. tenella* M. Bieb. and *F. meleagris* L.

CONCLUSIONS

Identified parasitic micromycetes during the observations that have been made were differentiated according to the disease they cause on plants Thus, from the downy mildews group were identified two species of micromycetes belonging to *Peronospora* genus, respectively: *Peronospora corydalis* de Bary on *Corydalis solida* (L.) Clairv. plants and *Peronospora ficariae* (Ness v. Essenb.) Tul. on *Ranunculus ficaria* L. plants.

From the rust group diseases were identified micromycete species belonging to different genera such as: *Tranzschelia pruni-spinosae* (Pers.), Syn. *Aecidium punctatum* Pers.; *Uromyces ficariae* (Schum) Lév.; *Puccinia rossiana* (Sacc.) Lagh., Syn. *Puccinia liliacearum* Duby ssp. *rossiana* Sacc.; *Uromyces lilii* (Link.) Fuck.

From the identified micromycetes, *Uromyces lilii* (Link.) Fuck. show a special interest because in our country this micromyceta does not appear cited on the host plant *Fritillaria meleagrioides* Patrin ex Schult. & Schult. f.

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