

## NEW SAPROPHYTIC AND PARASITIC FUNGI FROM ROMANIAN MYCOFLORA.

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### Abstract

The knowing of micromycetes from an area and their spread is very necessary to combat pests that cause diseases on plants, animals and human, also to multiply the useful micromycetes that are producing antibiotics or ferments. Mycoflora research conducted in 2012-2013 revealed the emergence of new parasitic fungal and new hosts plants for some known fungal in our country. Research conducted led to a fifteen fungal reports, two of them are new for the country, three are new cited like hosts in Romania, five are new for Moldova mycoflora, three are new hosts for Moldova mycoflora and two are extremely rare cited on crop plants or spontaneous flora in Romania.

**Key words:** identification, fungus, host plant.

Overseeing the development of pathogens from crop plants and spontaneous flora pointed out that in recent years, due to the evolution of climatic conditions appeared a number of new pathogens, parasites or saprophytic expanded to agents already known in the country. A number of pathogens that were reported in earlier works have resurfaced in recent years.

Report of these pathogens is required in order to know their infectious potential throughout Romania and beyond.

### MATERIAL AND METHOD

Species of fungi and host plants reported in 2012-2013 were determined performing microscopic sections and micrometer measurements on asexual or sexual organs in order to establish systematic classification of parasitic or saprophytic fungal species. Regarding the name of identified species these were checked based on reference monographs.

### RESULTS AND DISCUSSIONS

During the research period were identified and determined the following micromycetes:

*Peronospora arthuri* Farl., Bot. Gaz. VIII. p. 315 (1889); Sacc., VII, p. 248 (1888); Gäumann, Beitr. zur einer Monogr. der Gatt. *Peronospora* Corda, Zürich, p. 299-(1923).

*Oenothera biennis* L. plants collected from Barsana, Maramures County on 07.10.2013 had symptoms of downy mildew, yellow spots, on the underside of the leaf with a white down represented by sporangia and sporangiophores of the fungus. Sporangiohophores were 7.5  $\mu\text{m}$  wide at the base, are 3-4 dichotomically branched and endings past have sharp peak (Fig. 1).



Figure 1 *Peronospora arthuri* -sporangiophores

Oval or spherical sporangia have sizes ranging between 20-38 x 12.8 to 30  $\mu\text{m}$  that fall within the limits described by Gäumann.

This fungus is described by Farlow in 1888 and then cited Gäumann in Switzerland in 1923.

Subsequent work on *Peronosporaceae* family in Europe and Romania (Tr. Savulescu) cites no longer so *Peronospora arthuri* Farlam. parasitic on *Oenothera biennis* L. is a new micromycetes for romanian mycoflora.

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***Phomopsis leptostromiformis* Bubak**, Exs. No.660; Lind. Dan. Fungi, p.422(1898).

Sin.- *Cryptosporium leptostromiforme* Kühn (1880); Grove, Brit. Stem and Leaf fungi vol. I, p.199 (1935).

Ornamental lupine leaves - *Lupinus polyphyllus* Lindl. showed discolored areas that soon were dried, finally appearing brown with concentric area.

On the surface of the affected areas were observed scattered uniformly picnidia black of 100-200  $\mu\text{m}$  diameter, under globular, papillary, the amount bullous epiderma with a pore of 20  $\mu\text{m}$  diameter.

Bubak describes this micromycetes as anamorphic form of *Diaporthe lupini* Harkn.

Fungus that were collected from *Lupinus polyphyllus* Lindl. in Barsana, Maramures County on 07.10.2013, are new to romanian mycoflora.

***Eutypa spinosa* (Pers.) Tul., Sel. Fung. Carp., II, p.59(1863); Sacc. Syll. Fung., I p.169(1882); Migula, Kr. Fl. Bd. III, Pilze 3 Teil, 1 Ab., p.507(1913); Dennis, British Ascomycetes p.298(1968); Sandu-Ville C., *Pyrenomycetes-Sphaeriales* fungus from România, p.82 (1971).**

Sin.-*Sphaeria spinosa* Pers.(1801);

*Valsa spinosa* (Pers.) Nitschke.

On branches of *Robinia pseudacacia* L., harvested in Iași on 04.10.2013, have on wood stroma with 4mm in diameter . Also on wood were observed black long spikes that represent the necks perithecia (fig. 2). They are closely crowded and contain ascus with 32-44x5-6  $\mu\text{m}$ , with 8 each increase.

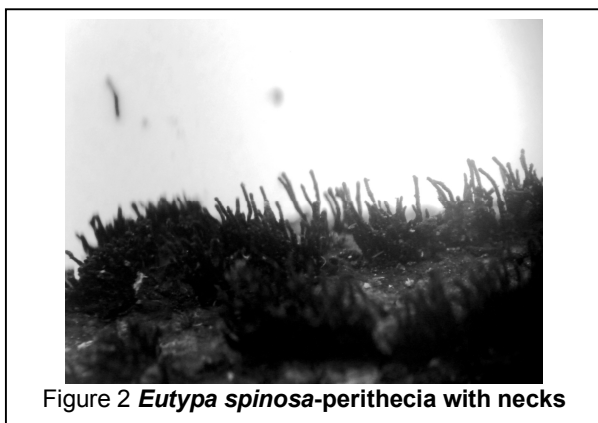


Figure 2 *Eutypa spinosa*-perithecia with necks

Ascospores are fusiform, located on two rows, slightly curved, unicellular with 8-10 x 2  $\mu\text{m}$ .

This fungus is cited in Romania by Hazslinsky in 1872, by Fuss and 1878 on unidentified wood and on *Fagus sylvatica* L. by Rehm in 1882. *Robinia pseudacacia* L. is new host plant of this fungus for Romania.

***Eutypa scabrosa* (Bull.) Fuck., Symb. Myc.p.171(1869); Sacc., Syll. Fung., I, p.71(1882).**

Dead wood of *Malus domestica* L., harvested in Iasi on 04.04.2013, have black stroma that include haotic arranged perithecia, spherical, with small conical holes for ascus evacuation. Ascus are cylindrical, clubs, with a very long peduncle, 45 x 4  $\mu\text{m}$ . Ascospores are disposed in two rows in the top of the ascus, are eight cylindrical, slightly curved, slightly brown, of 6-7 x 1.5  $\mu\text{m}$ . In Romania fungus is cited by Hazslinschy and Sandu-Ville on *Corylus avellana* L. and by Ulea E. on *Vitis vinifera* L., therefore *Malus domestica* L. is new host for this fungus in Romania.

***Ovularia haplospora* (Spegaz.) Magn., Hedwigia XLIV, p.17(1904); Lindau, Rab. Kr. Fl., VIII, p.242(1907); Migula, Kr. Fl. Pilze III, 4 Teil, 2. Abt, p.75, taf. CIV, (1934).**

Sin.- *Ovularia pusilla* Sacc.(1881);

*Ramularia haplospora* Spegazzini (1880).

On *Alchemilla xanthchlora* Rothm. leaves harvested from Brasov-Sacele on 11.07.2013 were brown spots, irregularly scattered on the leaves and petiole. On the underside of the lamina appears a whitish efflorescence consists by conidiophores and conidia.

Conidiophores are hyaline, without septa and support the unicellular conidia, cylindrical or round, colorless, of 7x2.5  $\mu\text{m}$  whose content has no oil droplets.

Fungus is reported in Romania on *Alchemilla glaucescens* Wallr. by several authors between the years 1962-1977, on *Al. mollis* (Buser) Rothm in 1963 and on *Alchemilla* sp., in Moldova was cited on in 1969 and *A. vulgaris* L. between 1050-1964 years, so *Alchemilla xanthchlora* Rothm. Romania is the new host for this fungus.

***Botryosphaeria quercinum* (Schw.) Sacc., Syll. Fung. I, 456 (1882); Arx et Müller, Die Gatt. Der Amerosporen *Pyrenomycetes*, p. 33, (1954); Sandu-Ville C., *Pyrenomycetes-Sphaeriales* fungus in Romania, p.105 (1971).**

Branches of *Juglans regia* L. taken from Iasi on 06.03.2013 have dispersed black stroma, circular, that pass through periderm with a height of 0.5-1 mm. On stroma are perithecia with cylindrical ascus of 150x20  $\mu\text{m}$ , with 8 ascospores, disposed on 1-2 rows. Ascospores are unicellular, elliptical of 20x9  $\mu\text{m}$ .

The fungus has been reported on *Juglans regia* and *Salix* but is new for Moldova area.

***Gibberella pulicaris* Sacc., Michelia I, p. 43 (1877); Sacc., Syll. Fung. II, p.552 (1883); Migula, Kr. Fl. Bd. Pilze 3 Teil, 2, Ab,p.757(1913); Dennis, Britsh., *Ascomycetes*, p.253(1968).**

Sin.-*Botryosphaeria pulicaris* Ces et de Not (1863).

*Juglans regia* L. branches taken from Iasi on 04.04.2013 have stroma with perithecia that pustular raises the periderm to 1-2 mm.

Perithecias are spherical with elliptical ascus of 60-70  $\mu\text{m}$  with eight ascospores colorless, with four septa, disposed in two rows of 18-23x6  $\mu\text{m}$ .

Fungus is cited in on *Ficus*, *Cytisus*, *Sambucus*, *Morus* but *Juglans regia* L. is a new host for Moldova area.

***Alternaria cucumerina*** (Ell. et Everh.) Elliot., Amer. J. Bot., IV.p.439(1917); Joly P., Le Genre *Alternaria*, p. 142(1964); Aurelia Crisan, Contr. Bot., Univ. Babes Bolyai, Grad. bot Cluj Napoca, p.11-12(1976); Alexandri Al., Centr. Mat. didac. prop. agr., Bucharest (1977).

*Cucurbita pepo* L. fruits, from Iași harvested on 10.12.2012, have an superficial black mycelium spots, dense, on wich appear short chains of brown, warty conidia of 67-68 x 21  $\mu\text{m}$  with a peduncle upwards of 100  $\mu\text{m}$ .

*Alternaria cucumerina* (Ell. et Everh.) Elliot. is a new host for Moldova mycoflora.

***Fusarium oxysporum*** (Schlecht.)Sn. & Hansen f.sp. *cucumerinum* Owen, Flora berol II, p.139(1824); Snyder&Hansen, Amer.J. Bot XXVII, p.64-67(1940); Booth, The Genus *Fusarium*, p.130, C.A.B. (1971).

This fungus was determined on ornamental variety of *Cucurbita pepo* L. fruit on 10.12.2012 in Iasi. On fruits appears an area covered by a white felt mycelian inducing partial sinking pulp that is colored in pink-purple color that is typical damage caused by fungi genus *Fusarium*. Mycelia hyphae are typically filamentous, are floc and support microconidia and macroconidia of 27-60 x 3-5  $\mu\text{m}$  with 3-5 transversal septa.

Fungus is new for Moldova mycoflora.

***Valsaria insitiva*** Ces et De Not., Schema di class. Sphaeriacei, p.205 (1863); Sacc.,Myc. Ven., p.148, tabXV, fig.5-10 (1874); Sacc., Syll.Fung. I, p.741 (1882); Winter, Die Pilze, IIAb., p. 804 (1887); Sacc., Syll. Fungi XIII, p.532 (1898); Migula, Kr. Fl. Bd. III, Pilze 3 teil. I Ab, p. 655 (1913); Dennis, Br. Ascomyc., p. 315 (1968); Sandu-Ville C., *Pyrenomyces-Sphaeriales* fungus from Romania, p. 254 (1971).

*Gledithia triacanthos* L. dry branches, collected from Iasi on 04.04.2013 have cracks with black fungal stroma. În stromele de 1/3 mm se găsesc grupuri de peritecii cu pereți negri cărbunoși și cu gâturi cilindrice. On 1/3 mm stroma are groups of perithecium with black coal walled and cylindrical necks. Ascum are cylindrical, short pedunculated of 110x13  $\mu\text{m}$ , with 8 elliptical spores, strangled around the septa, brown of 16 x 9-10  $\mu\text{m}$  (fig 3).

This fungus is cited on several fungal hosts in Romania but *Gledithia triacanthos* L. is a new host plant for Moldova area.

***Volutella ciliata*** (Alb. et Schw.)Fr., Syst. Myc III, p.467(1832); Sacc., Fungi Ven. V, p.198 (1876); Sacc., Fungi ital., Tab.729(1877); Sacc., Syll. Fung. IV, p.682 (1886) ; Lindau, Rab. Kr. Fl., p.484 (1910); Migula, Kr. Fl. Pilze III, 4 Teil, 2ab. , p. 493 , taf. CLXII, fig. 17 (1934) ; Negru Al.,O. Verona, Mycopath. Mycol. appl.XXX, p.305(1966).

Sin: *Tubercularia ciliata* Alb. Et Schw.

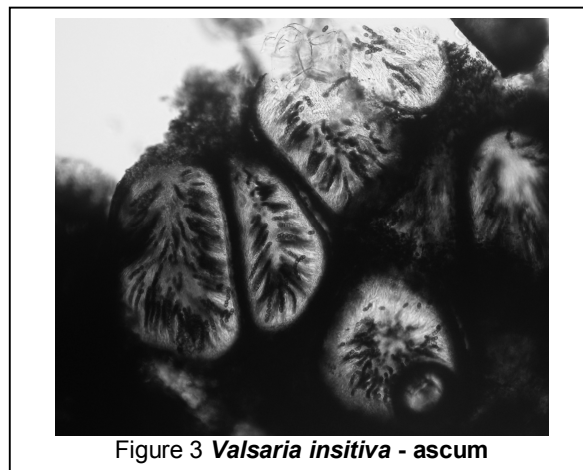


Figure 3 *Valsaria insitiva* - ascum

*Cucurbita pepo* L. fruits analyzed in Iasi on 10.12.2012 have brown spots to the surface with many frutification to 200 mm diameter, white to pink, with numerous spines of 300-4 x 8  $\mu\text{m}$ . Conidiophores are hyaline of 10 x 1  $\mu\text{m}$  and support elliptical conidia, hyaline of 5-7 x 2  $\mu\text{m}$ .

On mycoflora fungal from Romania this fungus is cited only once, in 1966 by Negru A. and Verona O. on *Cucurbita pepo* L. seeds that were in germination stage.

*Cucurbita pepo* L is new host plant for Moldova mycoflora.

***Ovularia cucurbitae*** Sacc., Bull. Soc. Myc. France, XII, p.71, taf.VII, fig.1(1896); Sacc., Syll. Fung. XIV, p.1053(1889); Winter, Die Pilze,VIII, p. 255(1907).

The fruits of *Cucurbita pepo* L.,-ornamental variety, analyzed in Iasi on 10.12.2012 presents on their surface concentric zone covered by mycelium slightly orange. Conidiophores are hyaline, unicellular, elongated of 20-30 x 3  $\mu\text{m}$ .

Elongated conidia have on basal a short brief and measure 13-15x5  $\mu\text{m}$ . Conidiile alungite au la bază un scurt pedicel și măsoară 13-15 x 5  $\mu\text{m}$ . Oblong conidia have basal a short peduncle of 13-15x5  $\mu\text{m}$ . In our country this fungus is cited only once by Maria Bechet et al. in 1978 on Zarandului Mountains, but not *Cucurbita pepo* L. wich is a new host plant for Moldova mycoflora.

***Phoma cucurbitacearum*** (Fries.) Sacc., Syll. Fung. III, p.148 (1884); Allescher, Die Pilze Fungi imper., IV Ab., p.284 (1901); Migula, Kr.Fl. Bd. III, Pilze 4 Teil, 1 Ab, p.84 (1921);

Sin. *Sphaeria cucurbitacearum* Fr.

*Cucurbita pepo* L.,- ornamental variety fruits, analyzed in Iasi on 10.12.2012 presents on their surface pycnidia of 150-180 μm. Inside pycniospores are oblong, hyaline, 7.5 μm long and 2 μm wide. From pycnidia besides pycniospores are out many bubbles of fat. This fungus is rarely reported in Moldova area.

***Plasmopara pusilla*** (De Bary) Schröter, Kr. Fl. Schles., I, p.237 (1886); Tr. Săvulescu, Stud. morf., biol. and sist. gen. *Sclerospora*, *Basidiophora*, *Plasmopara* și *Peronoplasmopara*, p. 348 (1951).

*Geranium pratense* L. plants collected on 12.07.2013 from Brasov-Sacele have on leaves characteristic spots of mildew that shortly becoming brown. On the underside leaves spots there is a white efflorescence consists of sporangiophores by 80-100 μm long, dichotomically or tricotomic branched that on the last endings support sporangia of 24-40 x 18-14 μm.

Micromycetes are reported by different authors between the years 1939-1977, but on Moldavia Herbarium is present only like a brought material from Hungary. Micromycetes are rarely reported.

## CONCLUSIONS

The climate of 2012 and 2013 were favor for extending number and spreading area of pathogens on crop plants and spontaneous flora.

Ornamental plants were parasitized by two new fungal for Romanian mycoflora: *Peronospora Arthuri* Farlam. parasitic on *Oenothera biennis* L. and *leptostromiformis* Bubak parasitic on *Lupinus polyphyllus* Lindl. Ornamental plant protection

works should prevent expansion of these pathogens.

On *Cucurbita pepo* L., ornamental variety fruits, as new host, have been identified: *Alternaria cucumerina* (Ell. et Everh.) Elliot, *Fusarium oxysporum* (Schlecht.) Sn. & Hansen f.sp. *cucumerinum* Owen *Volutella cilliata* (Alb. et Schw.) Fr., *Ovularia cucurbitae* Sacc., *Phoma cucurbitacearum* (Fries.) Sacc., micromycetes for whose development must be must be taken into account to preserve these fruits.

Walnut branches parasitized by *Botryosphaeria quercinum* (Schw.) Sacc., and *Gibberella pulicaris* Sacc., as those of apple attacked by *Eutypa scabrosa* (Bull.) Fuck., should be removed and burned, in order to limit the extension of these pathogens.

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