ACTA MYCOLOGICA
Vol. 29 (1): 121-127
1994

Parasitic *Hyphomycetes* of the Białowieża National Park. I.

WIESŁAW MUŁENKO

Department of Botany, Institute of Biology, Maria Curie-Skłodowska University,
Akademicka 19, 20-033 Lublin, Poland

M u ł e n k o W.: *Parasitic Hyphomycetes of the Białowieża National Park. I.* Acta Mycologica 29 (1): 121-127, 1994.

Some new species of parasitic *Hyphomycetes* (*Deuteromycetes*) were collected in Poland: *Aureobasidium microstictum* (Bub.) Cke, *Botrytis convallariae* (Kleb.) Ondrej, *Botrytis globosa* Raabe, *Cercospora cardaminae* Losa, *Passalora comari* (Peck) U. Braun, *Ramularia ludwigiana* Syd. and *Spilocea fraxini* (Aderh.) Sivan. The descriptions, illustrations and remarks on its occurrence are given.

Key words: *Hyphomycetes, Deuteromycetes*, fungi, distribution, ecology.

INTRODUCTION

Parasitic *Deuteromycetes* on wild plants have been the object of interest of Polish mycologists for many years. Among the publications which have appeared up to the present those which deserve special attention are floristic scientific descriptions of some more interesting regions of Poland such as: Tatras National Park (S t a r m a c h o w a, 1963), Babia Góra National Park (C h l e b i c k i, 1989), Ojców National Park and the Pieniny National Park (K u ć m i e r z, 1973, 1977), Łęczna-Włodawa Lake District (M u ł e n k o, 1988 a, b) as well as Szczecin voivodeship (M a d e j, 1974) and the River Bug Valley (D a n i l k i e w i c z, 1987). Despite many years' investigations *Deuteromycetes* fungi belong to those groups of plant pathogens which are still characterised by a very small degree of cognition. This is confirmed, on the one hand, by numerous reports on fungi new to the Polish flora, and on the other by relatively small amount of papers describing their distribution over the area of Poland. The only monographic study concerning imperfect fungi is the work describing *Dematiaceae* (B o r o w s k a, 1986).

Parasitic *Deuteromycetes* were not the object of profound ecological analyses, either. They were rather treated as the object of additional and complementary

observations. However, the results of investigations prove that they constitute quite a numerous group among all the pathogens recorded in the particular regions. Some of the authors reported that many fungi among *Deuteromycetes* belong to very important pathogens of field cultivations and one may expect that they play a similar role in the natural environment (K u ć m i e r z, 1982).

STUDY AREA, MATERIALS AND METHODS

Between the years 1987 and 1990 observations were made on the occurrence of parasitic fungi of plants in natural habitats. They were carried out in the Białowieża National Park, division 256 (permanent research area, V-100, of the Białowieża Geobotanic Station of Warsaw University), in six forest communities dominating in this area: *Tilio-Carpinetum, Circaeo-Alnetum, Carici elongatae-Alnetum, Peucedano-Pinetum, Pino-Quercetum* and *Querco-Piceetum* (Fig. 1 A, B). Methods, results and the investigated area were described in detail by: R i j k e n (1976), F a l i ń s k i (1991) and F a l i ń s k i, M u ł e n k o (1992).

RESULTS

The basic result of studies carried out by the author was the collection and determination of 315 pathogenic species from different systematic groups. Imperfect fungi (*Deuteromycetes*) dominated – 180 species (60 % of collection).

Analysis of the state of investigation of one of the orders of this group – *Hyphomycetes* – carried out in Poland after the completion of the studies proved that among the collected fungi (45 species) there is quite a big group (comprising 8 species) of fungi, which is new to our flora. In the present paper morphological characterization was presented and remarks were made on the occurence of seven species; one of very rare species in Europe – *Gyoerffyella oxalidis* Vanev collected on *Oxalis acetosella* L. – was characterised in a separate publication (M u ł e n k o, 1993).

Among the fungi specified in this paper 3 species are very seldom recorded in the investigated area. *Aureobasidium microstictum, Cercospora comari* and *Ramularia ludwigiana* have only single localities here.

The other species were collected from at least 5 localities: *Botrytis globosa* occurred commonly almost in the whole area of occurrence of its host plant (*Allium ursinum*), whereas *Cercospora cardaminae* and *Spilocea fraxini* were quite frequently recorded in transitional zones between deciduous forest communities (Fig. 1 C).

Botrytis convallariae (on *Maianthemum bifolium*) (Fig. 1 D) appeared to be a common species. It was chiefly found in the shady parts of the deciduous forest (*Tilio-Carpinetum*), more seldom in coniferous forest communities; the host plant occured commonly almost in the whole of the investigated area.

The included maps indicate that most localities of the discussed species are to be found in areas of ecotonic nature. It seems to be very probable that the conditions in transitional zones favour the infections of plants by pathogenic fungi.

Map schemes were elaborated in the Białowieża Geobotanic Station of Warsaw University. The material was essembled in the Herbarium of the Department of General Botany at UMCS. The research was made within the Project "CRYPTO" (grant CPBP 04.10.07).

DESCRIPTION OF THE SPECIES

The elaboration of the collected material was carried out on the basis of the following items from literature: Brandenburger (1985), Ellis et Ellis (1987), Sivanesan (1984), Moročkovskij et al. (1971).

Abbreviations and denotations used throughout the paper were as follows: *T-C – Tilio-Carpinetum, C-A – Circaeo-Alnetum, Ce-A – Carici elongatae-Alnetum, P-Q – Pino-Quercetum, P-P – Peucedano-Pinetum;* V – X – months of collection; frequency of occurrence of species: 1 – seldom, 2 – faily abundantly, 3 – commonly.

Aureobasidium microstictum (Bub.) W. B. Cke (= *Kabatiella microsticta* Bub.)

Leaf spots oval or irregular, light brown with purple border, 3-10 mm Ø. Acervulus 40-60 µm Ø, on both sides of leaf blades. Conidiophores clavate or cylindrical, multiseptate measuring 13-33 x 5.5-11 µm; terminal cells markedly widened, with short outgrowths. Conidia (endoconidia) ellipsoid, slightly curved, smooth, immersed in slimy excreation of the mycelium, 6-15 x 2.5-4 µm (Fig. 1 C-1, 2 A). On *Maianthemum bifolium* (L.) F. W. Schmidt: *C-A*, 1, VII, and *Polygonatum multiflorum* (L.) All.: *P-P*, 1, VIII.

Botrytis convallariae (Kleb.) Ondrej (= *Botrytis cinerea* Pers. ex Nocca et Balbis f. sp. *convallariae* Kleb.)

Leaf spot at first light brown, later grey, oval, 0.5-5 cm Ø or irregular, frequently covering 2/3 of the area of the leaf blade. Colonies on the lower part of leaves, diffuse. Conidiophores big, up to 2000 x 14-20 (-24) µm, conidia 14-24 x 8-12 µm (Brandenburger, 1985: conidiophores 2200 x 12-17 µm, conidia 12-20 (24) x (5) 10-12 (16) µm) (Fig. 1 D, 2 B). On *Maianthemum bifolium* L.: *P-P, P-Q, T-C*, 3, V-VI.

In the investigated area, there was also another species of the genus *Botrytis* – *Botrytis cinerea* Pers. ex Nocca et Balbis which occurred on *Maianthemum bifolium.* It is distinguished from *B. convallariae* by thicker conidiophores (2000 x 16-30 µm) and smaller conidia (8-14 x 6-9 µm), provided with a distincly conspicuous, short outgrowth in the lower part of conidium (Brandenburger, 1985). This species was recorded much more seldom in comparison with *B. convallariae*, although it is known as one of the most common fungi (both parasite and saprophyte). It was not, however, recorded from Poland on *Maianthemum bifolium.*

Botrytis globosa Raabe

Leaf spots grey, at first oval, very quickly changing into widespread, transparent, covering the whole area of leaf blade. Colonies caespitose or diffuse on the lower part of leaves. Conidiophores light brown, single, straight or branched, widened at the base, 250-700 x 12-16 µm. Terminal branches smooth, colourless, permanent. Conidia round, 12-16 µm Ø or slightly oval, 14-18 x 12-16 µm, with short papilla 1-1.5 µm wide and 0.5-1 µm high at the base (B r a n d e n b u r g e r, 1985: conidiophores 250-1000 x 10-20 µm, conidia 10.5-23.5 x 9-20 µm) (Fig. 1 C-2, 2 C). On *Allium ursinum* L.: *T-C*, 3, V-VI.

This species, according to E l l i s et E l l i s (1987) is the anamorph of *Botryotinia globosa* Buchwald (*Helotiales*). The occurrence of teleomorphic stage was not recorded in Poland up to the present.

Cercospora cardaminae Losa

Leaf spots oval or irregular, grey, with distinct ochre margin. Mycelium deposit on the lower side of leaves, grassy. Conidiophores straight or slightly curved, (2)-4-(7) septate, measuring 40-85 x 3-6 µm, brown, with hyaline terminal cells. Conidia conversely clavate, 3-7 septate, 45-110 x 4 µm (B r a n d e n b u r g e r, 1985: conidiophores 50-70 x 3-5 µm, conidia 50-104 x 4 µm) (Fig. 1 C-3, 2 D). On *Cardamine amara* L.: *C-A*, *Ce-A*, 1, IX.

Passalora comari (Peck) U.Braun (= *Cercospora comari* Peck)

Leaf spots irregular, reddish. Conidiophores on the lower part of leaves, multiseptate, 130-250 x 4-7 µm, brown. Conidia straw-coloured, 4-septate, measuring 40-65 x 6-8 µm (B r a n d e n b u r g e r, 1985: conidiophores 150-300 x 5-7 µm, conidia 45-75 x 6-8 µm) (Fig. 1 C-4, 2 E). On *Potentilla palustris* (L.) Scop.: *C-A*, *Ce-A*, 2, VI-VII.

Ramularia ludwigiana Syd.

Spots minute, oval, 2-4 mm Ø, light brown or grey, surrounded by slightly darker margin. Conidiophores on the lower side of leaves, single or – much more rarely – in small groups, straight or slightly curved, 10-20 x 1.5-2.5 µm, slightly widened at the base. Conidia in splitting chains, cylindrical, 2-septate, 8-18 x 2-4 µm (B r a n d e n b u r g e r, 1985: conidiophores 5-20 x 1.5-2.5 µm, conidia 11-18 x x 2-4 µm) (Fig. 1 C-5, 2 F). On juvenile leaves of *Impatiens noli-tangere* L.: *C-A*, *Ce-A*, 1, V.

Spilocea fraxini (Aderh.) Sivan. (= *Fusicladium fraxini* Aderh.)

Leaf spots large, oval or round, 0.5-3 cm Ø, light brown or yellowish. Colonies on the lower side of leaves in form of solitary conidiophores or their agglomerations, caespitose. Conidiophores straight or slightly curved, 1-septate, up to 30 µm long. Conidia fusiform or clavate, 2- or more seldom 1-septate, olivaceous, measuring 12-24 x 4-6 µm (B r a n d e n b u r g e r, 1985; S i v a n e s a n, 1984: conidia 15-25 x x 4-6 µm, M o r o č k o w s k i et al., 1971: conidia 12-20 x 4-6 µm) (Fig. 1 C-6, 2 G). On *Fraxinus excelsior* L.: *T-C*, *Ce-A*, 2, VII.

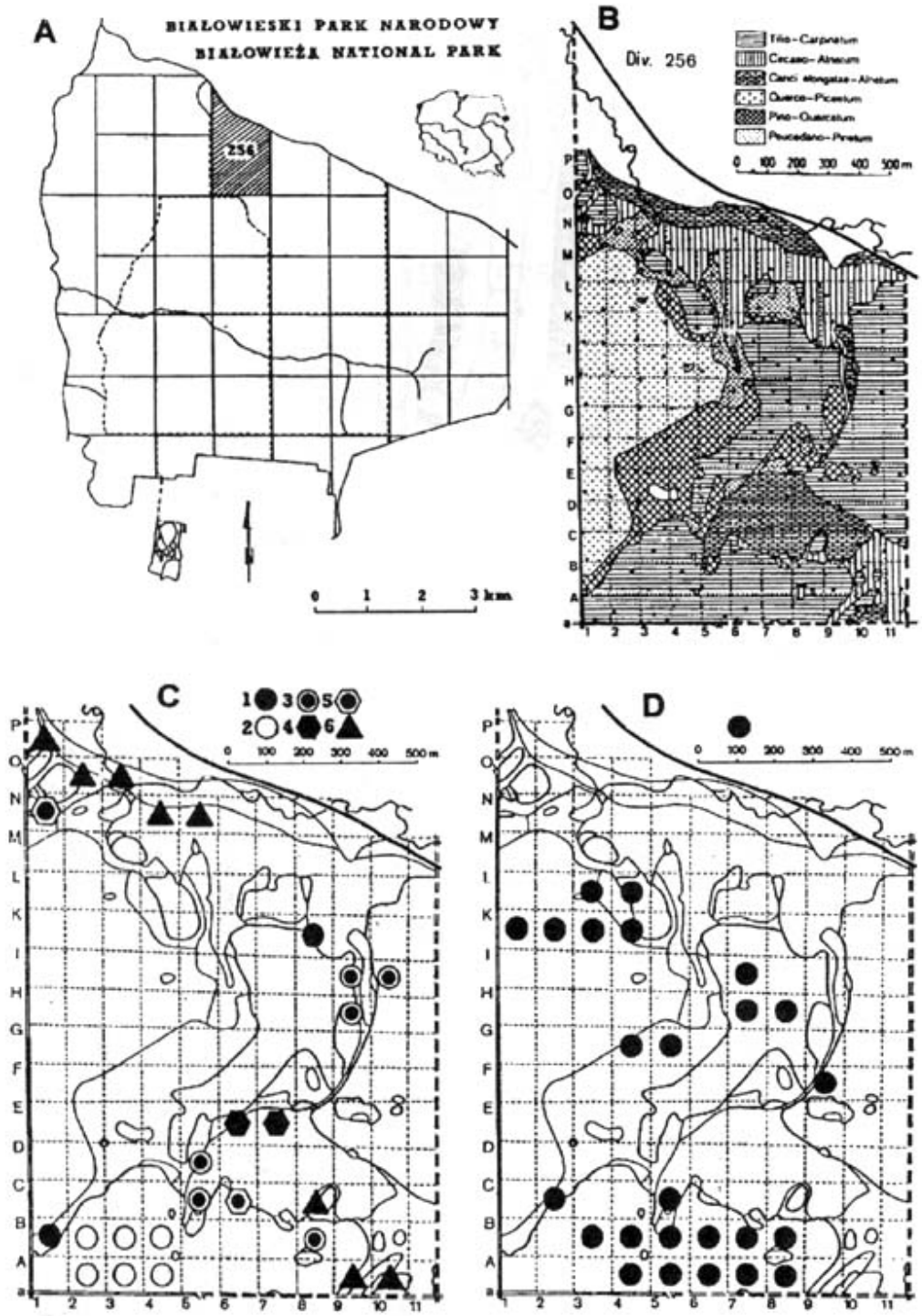

Fig. 1. The study area

A – Location of the permanent plot No. 100 in the Białowieża National Park; B – Vegetation map of the forest compartment 256 (Rijken, 1976); C – Distribution of localities: 1 – *Aureobasidium microstictum* (on *Maianthemum bifolium*, K-08 and *Polygonatum multiflorum*, B-01); 2 – Botrytis *globosa* (on *Allium ursinum*); 3 – *Cercospora cardaminae* (on *Cardamine amara*); 4 – *Passalora comari* (on *Potentilla palustris*); 5 – *Ramularia ludwigiana* (on *Impatiens noli-tangere*); 6 – *Spilocea fraxini* (on *Fraxinus excelsior*). D – Distribution of localities of *Botrytis convallariae* (on *Maianthemum bifolium*)

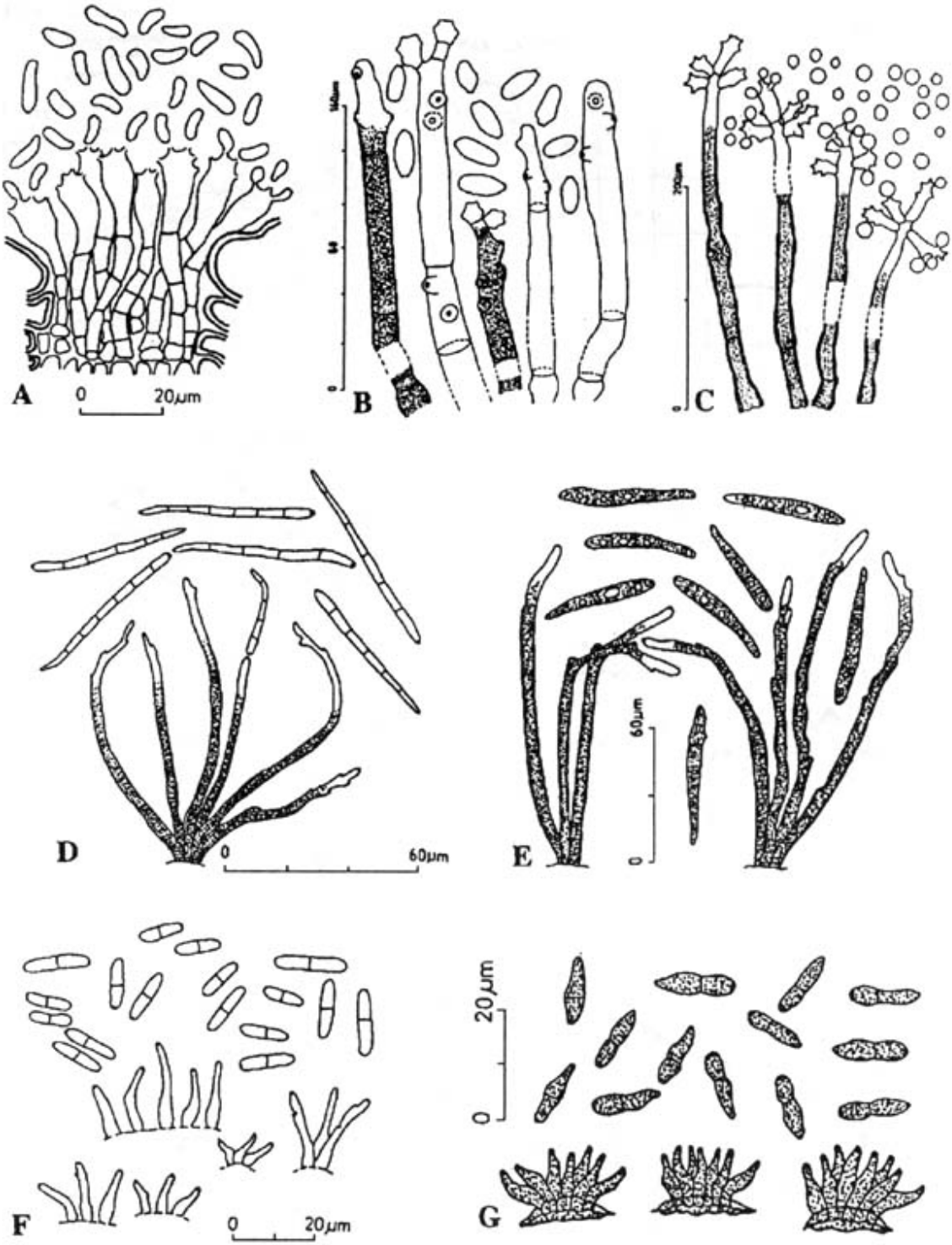

Fig. 2. Conidiophores and conidia

A – *Aureobasidium microstictum* (on *Maianthemum bifolium*), B – *Botrytis convallariae* (on *Maianthemum bifolium*), C – *Botrytis globosa* (on *Allium ursinum*), D – *Cercospora cardaminae* (on *Cardamine amara*), E – *Passalora comari* (on *Potentilla palustris*), F – *Ramularia ludwigiana* (on *Impatiens noli-tangere*), G – *Spilocea fraxini* (on *Fraxinus excelsior*)

This species, according to A. S i v a n e s a n (1984), is an anamorph of *Venturia fraxini* Aderh. (*Pleosporales*). This stage was not recorded in Poland, either.

A c k n o w l e d g m e n t s: The author would like to thank Dr Uve Braun (Martin Luter University, Halle-Wittenberg, Germany) for the critical revision of the identified species and text.

LITERATURE

B o r o w s k a A., 1986. Strzępczakowe (*Hyphomycetales*). [In.:] Flora Polska, Grzyby (*Mycota*) 16. PWN, Warszawa-Kraków, pp. 320.

B r a n d e n b u r g e r W., 1985. Parasitische Pilze an Gefäßpflanzen in Europa. G. Fischer, Stuttgart-New York, pp. 1250.

C h l e b i c k i A., 1989. Występownie *Pyrenomycetes* i *Loculoascomycetes* oraz ich anamorf w zbiorowiskach roślinnych Babiej Góry. Acta Mycol. 25: 51-143.

D a n i l k i e w i c z M., 1987 (1989). Grzyby pasożytnicze lewobrzeżnej doliny środkowego Bugu. Acta Mycol. 23: 37-80.

E l l i s M. B., E l l i s J. P., 1987. Microfungi on land plants. Croom Helm, London -Sydney, pp. 818.

F a l i ń s k i J. B., 1991. Program CRYPTO: Rośliny zarodnikowe w zbiorowiskach leśnych Białowieskiego Parku Narodowego. Phytocoenosis 3, Seminarium Geobotanicum 1: 316-320.

F a l i ń s k i J. B., M u ł e n k o W., 1992. Introduction. [In:] J. B. Faliński & W. Mułenko (eds), Cryptogamous plants in the forest communities of Białowieża National Park. Phytocoenosis 4, Archivum Geobotanicum 3: 1-10.

K u ć m i e r z J., 1973. Grzyby pasożytnicze w zbiorowiskach roślinnych Ojcowskiego Parku Narodowego. Ochrona Przyrody 38: 155-211.

K u ć m i e r z J. 1977. Studia nad grzybami pasożytniczymi z Pienin. Zesz. Nauk. AR Kraków, Rozprawy 52: 1-142.

K u ć m i e r z J., 1982. Mikroskopowe grzyby pasożytnicze roślin. [In:] K. Zarzycki (ed), Przyroda Pienin w obliczu zmian. Studia Naturae, s. B, 30: 210-232. PWN, Warszawa-Kraków.

M a d e j T., 1974. Materiały do mikoflory roślin woj. szczecińskiego. Rozpr. AR Szczecin 35: 1-235.

M o r o č k o w s k i j et al., 1971. Viznačnik gribiv Ukraini, 3. Nauk. Dumka, Kijev, pp. 696.

M u ł e n k o W., 1988 (1989) a. Mikroskopowe grzyby fitopatogeniczne Pojezierza Łęczyńsko-Włodawskiego. I. Udział grzybów pasożytniczych w zbiorowiskach roślinnych i ich fenologia. Acta Mycol. 24: 3-49 -1988 (1989) b, Ditto, II. Ibid. 24:125-171.

M u ł e n k o W., 1993. *Gyoerffyella oxalidis* – a new species of *Hyphomycetes* (*Deuteromycetes*) for the Polish fungal flora. Polish Bot. Stud. 5: 79-81.

R i j k e n M., 1976. Comparison of three maps of a natural forest vegetation obtained by different methods. Phytocoenosis 5. 2: 109-126.

S i v a n e s a n A., 1984. The bitunicate *Ascomycetes* and their anamorphs. J. Cramer, pp. 701.