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Epichloë clarkii – a new graminicolous species for Poland

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Epichloë clarkii White, described in 1993 from England has been noted from Wielkopolski National Park in Poland. The eggs and feed marks of hyperparasitic fly, *Botanophila* sp. have been found on teleomorph stromata of *E. clarkii.*

Key words: microfungi, distribution, *Epichloë*, grass, *Holcus*, Poland.

INTRODUCTION

The genus *Epichloë* (*Sordariomycetes*, Eriksson 2000) belongs to the family *Clavicipitaceae*, subfamily *Balansiaideae* and tribe *Balansieae.* A collective species *E. typhina* has been divided into several well distinguished taxa. White (1993, 1994), Leuchtmann, Schardl and Siegel (1994), Leuchtmann and Schardl (1998), Schardl and Leuchtman (1999) described nine species of *Epichloë.* White (1993) mentioned several species which should be excluded from the genus: *Epichloë bambusae* Pat., *E. cinerea* Berk. et Br., *E. cyanodontis* Syd., *E. oplismani* P. Henn., *E. sasae* Hara, *E. schumanniana* P. Henn., *E. volkensii* P. Henn. and *E. warburgiana* Magn.

Epichloë typhina (Persoon ex Fries) Tulasne et C. Tulasne was noted in Poland on the following host plants: *Dactylis glomerata* (Hellwig 1897), *Agrostis* (Namysłowski 1906), *Anthoxanthum odoratum, Alopecurus pratensis, A. geniculatus, Agrostis vulgaris, A. alba, Calamagrostis arundinacea, Holcus lanatus, H. mollis, Poa nemoralis, P. trivialis, Festuca ovina, F. rubra, Brachypodium pinnatum, B. silvaticum, Dactylis glomerata, Triticum caninum* (Schroeter 1908), *Poa pratensis* (Wróblewski 1920), *Dactylis*

aschersoniana (Dominik 1936), *Poa trivialis*, *P. pratensis* (Stec-Rouppertowa 1936), *Calamagrostis arundinacea* (Bujakiewicz et al. 1992; Mułenko 1996), *Holcus mollis* (Magnus 1895) and *Puccinellia distans* (Chlebicki and Lembicz in press). Schroeter (1908) noted it on *Holcus lanatus* in Zielona Góra, Raszówka near Lubin, Brzeg Dolny near Wołów, Szczodre near Oleśnica as well on *Holcus mollis* in Odrzański Zagaj near Zielona Góra, Czerwieńsk and Jawor. No doubt the collections from *Festuca*, *Brachypodium*, *Holcus* and *Agrostis* belong to the separate taxa.

White (1993) described a new species of *Epichloë clarkii* collected on culms of *Holcus lanatus* in North Wyke (England). The same species was also found in additional material examined by him (White 1993) form Herault (France), Oltenia (Romania) and Zürich (Switzerland).

The genus *Holcus* (velvet grass) belongs to the tribe *Aveneae* in the family *Poaceae* and it comprises about 8 species occurring in the temperate climate. *Holcus lanatus* L., syn.: *Notholcus lanatus* (L.) Nash ex Hitchc. (common velvet grass, or Yorkshire fog) is widely distributed in Europe. It is a very common species in Poland, especially in lowland habitats. It occurs on humus and peaty as well as mineral soils. It is a characteristic member of the *Molinio-Arrhenatheretea* class (Falkowski 1982).

Only few mycologists have paid more attention to the common velvet grass fungi in Poland. There are such species as *Puccinia coronata* on *Holcus lanatus* and *H. mollis* noted in all parts of Poland (Namysłowski 1911, Stec-Rouppertowa 1936, Juraszek 1950, Majewski 1979); *Puccinia hordei* G. Otth (Juraszek 1950, Majewski 1979 as *P. holcina* Erikss.); *Mastigosporium album* Riess (Juraszek 1950); *Ustilago striaeformis* (Westend.) Niessl. (Schroeter 1889, Juraszek 1950); *Aureobasidium pullulans* (de Bary) G. Arnaud (Namysłowski 1906, as *Dematium pullulans* de Bary); *Claviceps purpurea* (Fr.) Tul. syn.: *C. microcephala* (Wallr.) Tul. (Schroeter 1908, Juraszek 1950); *Epichloë typhina* (Persoon ex Fries) Tulasne et C. Tulasne, (Schroeter 1908). Magnus (1895) found *E. typhina* on *Holcus mollis* in Miechów near Góra (Gorzów Wielkopolski).

Farr et al. (1989) noted 23 species of microfungi on *H. lanatus* in North America. Lind (1930) noted *Leptosphaeria michotii* (West.) Sacc., *Ophiobolus herpotrichus* (Fries) Sacc., *Pleospora vagans* Niessl., *Vermicularia holci* Sydow, *Hendersonia herpotricha* Sacc., on *H. lanatus* in Denmark.

METHODS

Material was gathered in Wielkopolski National Park. The host plant locality was illustrated with a phytosociological record. The characters of fungus stromata and fly eggs were observed under stereomicroscope. The length of asci and ascospores were measured under Nikon microscope.

RESULTS

The occurrence of the fungus *Epichloë clarkii* on common velvet grass was observed in mid forest turf in an experimental area near Jeziory (Fig. 1), maintained by the Department of Plant Ecology and Environmental Protection = DPEEP (Adam Mickiewicz University) in Wielkopolski National Park. The turf appeared spontaneously on plots excluded from cultivation. Since the time the ground was abandoned the DPEEP has conducted experiments concerning spontaneous succesional changes on post-agricultural grounds (B a l c e r k i e w i c z and P a w l a k 1997). The area is surrounded by oak and hornbeam forests (*Galio sylvatici-Carpinetum*). The grass in mowed once a year at the location where *Epichloë clarkii* occurs on *Holcus lanatus*. The character of the turf is illustrated with a phytosociological record (Tab. 1).

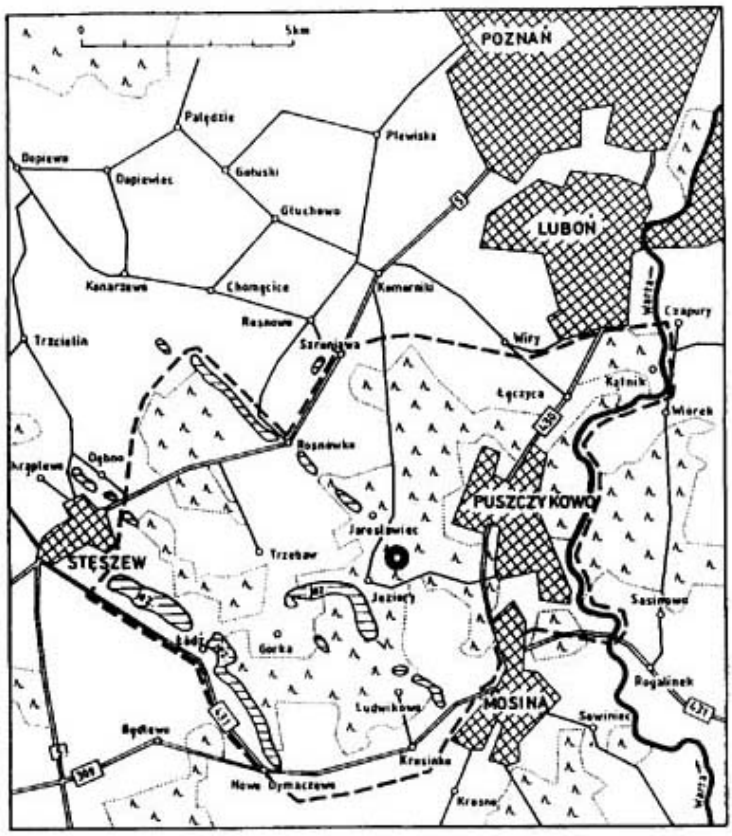

Fig. 1. Situation of the locality of *Epichloë clarkii* in Wielkopolski National Park

Holcus lanatus with tufts of *Epichloë clarkii* was found to be restricted to a single area of turf (ca. 20 m^2). The fungus occurred on several clumps of common velvet grass. It was present on most blades in each attacked clump.

Table 1
Phytosociological record of the turf (experimental area) near Jeziory in Wielkopolski National Park (Balcerkiewicz, unpubl. data)

Holcus lanatus	3.3	*Hypericum perforatum*	+
		Juncus conglomerates	+
Trifolium alpestre	2.3	*Luzula multiflora*	+
Agrostis tenuis	2.2	*Poa palustris*	+.2
Fragaria vesca	2.1	*Potentilla anserina*	+
Hieracium pilosella	2.1	*Primula veris*	+
Veronica chamaedrys	2.1	*Rumex acetosa*	+
Convolvulus arvensis	2.1	*Rumex acetosella*	+
Cerastium holosteoides	1.1	*Sagina procumbens*	+
Luzula pilosa	1.2	*Salix caprea*	+
Poa angustifolia	1.2	*Taraxacum officinale*	+
Poa trivialis var. *vivipara*	1.2	*Trifolium dubium*	+.2
Agrostis gigantea	+.2	*Veronica arvensis*	+
Ajuga genevensis	+	*Vicia angustifolia*	+
Ajuga reptans	+	*Juncus tenuis*	r
Anthoxanthum odoratum	+.2	*Oxalis fontana*	r
Astragalus glycyphyllos	+.2	*Pinus sylvestris*	r
Betula pendula	+	*Ranunculus repens*	r
Carpinus betulus	+	*Rumex thyrsiflorus*	r
Centaurium erythraea	+	*Solidago canadensis*	r
Conyza canadensis	+	*Trifolium arvense*	r
Coronilla varia	+.2	*Atrichum undulataum*	3.3
Elymus repens	+	*Brachythecium* sp.	+
Geum urbanum	+	*Mnium* sp.	+
Glechoma hederacea	+	*Scleropodium purum*	+.2

Epichloë clarkii White, Mycologia 85 (3): 449, 1993.

Notes: on living culms.

Description: Ascostroma very similar to that of *Epichloë typhina*. Stroma 11–28 mm long, 1.9–2.8 mm diam., perithecia pyriform, yellow, asci 115–180×6–8 μm with an apical thickening and pore, containing disarticulating and multiseptate ascospores. Ascospores filamentous, disarticulating at septa to form one- to five-septate part spores (32) 49–63 (70)×2–2.5 μm (Fig. 2).

Host: *Holcus lanatus*

Material examined: Wielkopolski National Park (Central Poland), 1100 m NE of Jeziory, tufts with *H. lanatus*, 8 June 2000, coll.: P. Szkudlarz, KRAM.

Comments: The teleomorph stage of *Epichloë clarkii* is heterothallic and can produce normal stromata with asci and ascospores after passing of spermatia by a host-specific hyperparasitic fly *Botanophila phrenione* complex (Pawlitz and Bultman 2000). The eggs and feed marks of fly larvae were observed on 7 among 8 of investigated stromata. The fungus was reported from England, France, Romania and Switzerland (White 1993).

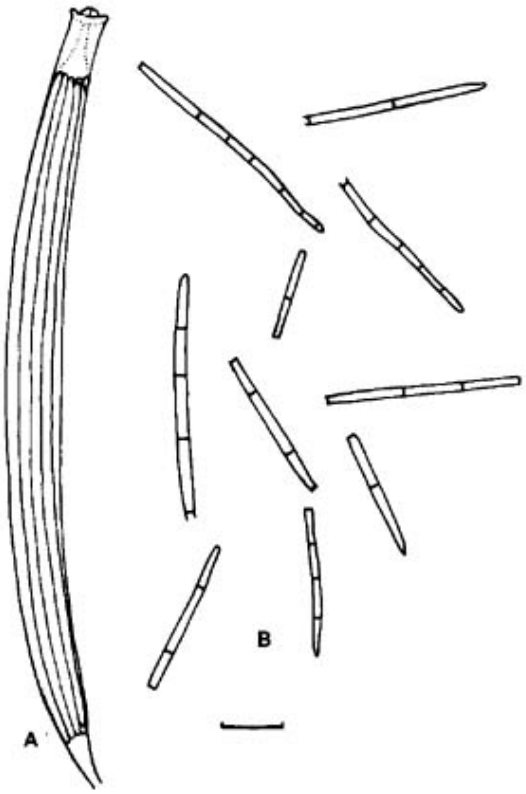

Fig. 2. *Epichloë clarkii*: A – ascus, B – partspores; bare – 10 μm

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Epichloë clarkii nowy gatunek występujący na trawach w Polsce

Streszczenie

Znany pasożytniczy gatunek *Epichloë typhina* został ostatnio podzielony na szereg dobrze się wyróżniających taksonów. Jednym z nich jest *Epichloë clarkii* White, grzyb dotychczas podawany z Szwajcarii, Rumunii, Francji i Anglii (White 1993). Gatunek ten został znaleziony przez drugiego z autorów w Wielkopolskim Parku Narodowym na dawnym gruncie porolnym niedaleko miejscowości Jeziory, obecnie powierzchni badawczej UAM.

Podkładki *E. clarkii* i *E. typhina* są heterotaliczne. Spermacja są przenoszone przez pasożytniczą błonkówkę *Botanophila* sp., która żeruje na podkładce konidialnej grzyba i składa później na niej jedno lub dwa jaja. Zbadano 8 podkładek grzyba, na 7 były jaja i ślady żerowania larw muchówek.