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Supplement to the Checklist of non-vascular and vascular plants of Slovakia. The species of microscopic fungi of the order Eurotiales

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Šimonovičová A. (2001): Supplement to the Checklist of non-vascular and vascular plants of Slovakia. The species of microscopic fungi of the order Eurotiales. – Czech Mycol. 53: 173–188

Submited are 50 species of microscopic fungi of the order Eurotiales, which are not listed in the Checklist of non-vascular and vascular plants of Slovakia, part Fungi (Lizoň and Bacigálová 1998). The first group is presented by those microscopic fungi which were isolated only once so far. So we consider them to be scarce or rare. From among 30 species of microscopic fungi more than a half belongs to the genus *Penicillium* (16 species) or genus *Aspergillus* (6 species). The genera *Eupenicillium, Eurotium* and *Paecilomyces* have two new species, *Emericella* and *Merimbla* only one species. The second group is presented by more frequently isolated species of microscopic fungi. From among 20 species the genus *Penicillium* dominates with 8 species, followed by the genus *Aspergillus* with 4 species. Other genera (*Byssochlamys*, *Dichotomomyces*, *Eupenicillium*, *Eurotium*, *Fennellia, Paecilomyces* and *Talaromyces*) are presented with one or two species. From the total number of 50 species of microscopic fungi the prevailing part was isolated from different soils (73.3–75.0 %), from different foodstuffs (3.3–30.0 %) and from other sources (23.3–45.0 %), including drinking water, dwellings and different materials in depositories and archives.

Key words: new records of microscopic fungi (Eurotiales), Checklist of non-vascular and vascular plants of Slovakia.

Šimonovičová A. (2001): Doplnok k Zoznamu nižších a vyšších rastlín Slovenska. Druhy mikroskopických húb radu Eurotiales. – Czech Mycol. 53: 173–188

Uvádzame 50 druhov mikroskopických húb radu Eurotiales, ktoré nie sú uvedené v Zozname nižších a vyšších rastlín Slovenska, časť Huby (Lizoň a Bacigálová 1998). Prvú skupinu predstavujú mikroskopické huby, ktoré boli doteraz na Slovensku izolované iba jedenkrát, a preto ich považujeme za vzácne, resp. zriedkavé. Z 30 druhov viac ako polovicu tvoria druhy rodu *Penicillium* (16), potom nasledujú druhy rodu *Aspergillus* (6), *Eupenicillium, Eurotium* a *Paecilomyces* (2), *Emericella* a *Merimbla* (1). Druhú skupinu tvoria častejšie izolované druhy. Z celkového počtu 20 opäť dominuje rod *Penicillium* zastúpený 8 druhmi a *Aspergillus* zastúpený 4 druhmi. Ostatné druhy (*Byssochlamys*, *Dichotomomyces*, *Eupenicillium*, *Eurotium*, *Fennellia, Paecilomyces* a *Talaromyces*) sú zastúpené 1–2 ×. Z celkového počtu 50 druhov mikroskopických húb bola prevážna časť izolovaná z rôznej pôdy (73.3–75.0 %), z rôznych potravín (3.3–30.0%) a z iného zdroja (23.3–45.0 %), ktorý predstavuje napr. pitná voda, vnútorné steny bytov, archivovaný materiál rôzneho pôvodu a pod. Druhy, doplnené o synonymá a bibliografické údaje, sú uvedené v abecednom poradí. Nomenklatúra je uvedená podľa Pitt et al. (2000). Autorské skratky sú upravené podľa Brummitt a Powell (1992).

The order Eurotiales (Ascomycetes – Ascomycota) includes 52 genera of microscopic fungi (Hawksworth et al. 1995), from which in Slovakia have been isolated only 13 genera. Among them, the most frequent were species of the genus *Aspergillus* and the genus *Penicillium* isolated from different soils (Bernát 1954, 1958, 1965, Braunová 1981, Pavličková 1994, Šimonovičová 1980, 1992, 1993, Vláčiliková 1978), from the phyllosphere of agricultural plants and from corn (Bernát et al. 1983, Bernát et al. 1984, Dubovská 1981, 1984, Dubovská et al. 1982, 1986), but from atypical biotopes and ecotopes, too (Franková and Šimonovičová 1999a, b, Franková et al. 1999, Šimonovičová and Franková 1998, Šimonovičová et al. 2000). For humans a very important and dangerous source of species of microscopic fungi of the order Eurotiales are contaminated foodstuffs, cereals and meal, cotton and flax (Jesenská and Poláková 1978, Jesenská and Šepitková 1984a, b, Jesenská et al. 1988, Jesenská and Piecková 1990b, Piecková et al. 1994, Piecková et al. 1992, 1996).

We submit a number of species of microscopic fungi of the order Eurotiales which are not listed in the Checklist of non-vascular and vascular plants of Slovakia, part Fungi (Lizoň and Bacigálová, 1998).

The species are arranged alphabetically, and synonyms and bibliography are included. Nomenclature is according to Pitt et al. (2000). The abbreviations of authors' names follow Brummitt and Powell (1992).

Order Eurotiales

Aspergillus Fr.:Fr.

Aspergillus chevalieri (L. Mangin) Thom et Church → *Eurotium chevalieri* L. Mangin.

Aspergillus clavatus Desm.

Isolated from garden soil in Bratislava and in Poprad, from compost, maize corn, peeled wheat, from maize flour, from foodstuff and dust from a mill (Piecková and Jesenská 1999b), from dried milk products for sucklings and baby foods (Jesenská and Poláková 1978), from meal, semolina and bread-crumbs (Jesenská et al. 1984, Jesenská and Šajbidorová 1984), from the inner mycoflora of malt, barley malt and from the surface of barley malt (Šepitková and Jesenská 1985a,b,c, 1986, 1988, Šepitková et al., 1987a, Šepitková et al. 1988, 1990, Šepitková and Jesenská 1990, 1991), from the surface of corn (Šajbidorová et al. 1988), from samples of substrates and air from different types of factories (Jesenská 1988), from cereals of domestic provenience (wheat corn and different sorts of flour) (Jesenská et al. 1988), from samples of roasted coffee-beans (Jesenská et al. 1989).

Aspergillus duricaulis Raper et Fennell

Isolated from different material (tonsils, stools, sputum, nose, vagina, dissecting material) from immunosuppressive patients with oncological diseases (Trupl et al. 1992).

Aspergillus fischeri Wehmer → *Neosartorya fischeri* (Wehmer) Malloch et Cain

Aspergillus flavus Link var. *columnaris* Raper et Fennell

Isolated from dried milk products for sucklings and baby foods (Jesenská and Poláková 1978).

Aspergillus glaucoaffinis Samson et W. Gams → *Eurotium pseudoglaucum* (Blochwitz) Malloch et Cain

Aspergillus janus Raper et Thom

Isolated from the inner mycoflora of malt (Šepitková and Jesenská 1985a), from malt-barley and malt (Šepitková and Jesenská 1988).

Aspergillus melleus Yukawa

Isolated from 45 cotton samples of different origin (Uzbekistan, U. S. A., China, Egypt, Russia) and from 24 domestic flax samples (Piecková and Jesenská 1996b).

Aspergillus niger var. *cinnamomeus* (Schiemann) Thom et Raper

Isolated from agricultural soils (Braunová 1981).

Aspergillus parasiticus Speare

Isolated from different sorts of foodstuff (Jesenská et al. 1980), from imported foodstuffs, such as roasted and non-roasted peanuts in chocolate, salt, sugar, or as a part of wafers, grated coconut and rice (Jesenská et al. 1988), from drinking water (Franková and Šimonovičová 1999b).

Aspergillus parvulus G. Sm.

Isolated from forest soil in the neighbourhood of Bratislava (Krakovská et al. 2000).

Aspergillus penicillioides Speg.

Isolated from wooden sculptures, picture canvases from depositories and from indoor air of the Slovak National Museum (Franková et al. 1999, Šimonovičová and Franková 1998).

Aspergillus reptans Samson et W. Gams → *Eurotium repens* de Bary

Aspergillus rugulosus Thom et Raper → *Emericella rugulosa* (Thom et Raper) C. R. Benj.

Aspergillus violaceo-fuscus Gasperini

Isolated from Albic Luvisols (Bernát 1965).

Byssochlamys Westling

Byssochlamys fulva Olivier et G. Sm.

Isolated from garden, forest and agricultural soils in different parts of Bratislava and from a flower bed in a private garden (Jesenská and Piecková 1994a), from non-specified soil (Jesenská and Piecková 1994b, Jesenská et al. 1994), from conserved fruit and fruit-juice (Jesenská et al. 1983).

Byssochlamys nivea Westling

Isolated from non-specified soil from a depth of 0–5 cm in the neighbourhood of Bratislava and Poprad (Jesenská and Piecková 1990a, 1991), from non-specified soils of Slovakia (Jesenská et al. 1992b, Jesenská et al. 1994, Jesenská and Piecková 1994b, 1995a, Piecková et al. 1994), from garden, forest and agricultural soils in different parts of Bratislava (Jesenská et al. 1992c), from soil of a private garden which had been fertilised with organic fertilisers (Jesenská et al. 1993), from a flower bed in a private garden (Jesenská and Piecková 1993, 1994a), from non-specified soils in different parts of Slovakia (Jesenská et al. 1992a, Jesenská and Piecková 1995a, Piecková and Jesenská 1997b), from soil samples after heating at 70 °C for 60 min. in a physiological solution (Piecková and Jesenská 1996a, 1997b, Piecková et al. 1996), from conserved fruit and fruit-juice (Jesenská et al. 1983), from stewed fruit and juice (Jesenská and Petríková 1985), from juice and the surface of stewed fruit, which had some signs of sensorical depreciation (Petríková et al. 1985), from equipment used for conserving fruit and vegetables and final products (Šepitková et al. 1987b, 1989), from mouldy stewed fruit (Jesenská and Piecková 1990a), from apricots (Kubátová et al. 1996).

Dichotomomyces D. B. Scott

Dichotomomyces cejpii (Milko) D. B. Scott

Isolated from non-specified soil from a depth of 0–5 cm in the neighbourhood of Bratislava and Poprad (Jesenská and Piecková 1990a, b, 1991), from garden, forest and agricultural soils in different parts of Bratislava (Jesenská et al. 1992c), from soil of different beds of a private garden which had been fertilised with organic fertilisers (Jesenská et al. 1993), from a flower bed in a private garden (Jesenská and Piecková 1993), from non-specified soils in different parts of Slovakia (Jesenská et al. 1992a,b; Jesenská and Piecková 1994b, 1995a, Piecková et al. 1992, Piecková et al. 1994), from garden, forest and agricultural soils in Bratislava and in Poprad (Piecková and Jesenská 1997a), from soil samples after heating at 70 °C for 60 min. in a physiological solution (Piecková and Jesenská 1997b).

Emmericella Berk.

Emmericella rugulosa (Thom et Raper) C. R. Benj

Anam.: *Aspergillus rugulovalvus* Samson et W. Gams
Syn.: *Aspergillus rugulosus* Thom et Raper
Isolated from Albic Luvisols (Bernát 1965) as *Aspergillus rugulosus*.

Eupenicillium F. Ludw.

Eupenicillium javanicum (J. F. H. Beyma) Stolk et D. B. Scott
Anam.: *Penicillium indonesiae* Pitt
Syn.: *Penicillium javanicum* J. F. H. Beyma
Isolated from Albic Luvisols (Bernát 1965), from floodplain forest soils near Gabčíkovo (Bučková and Bacigálová 1999) as *Penicillium javanicum*.

Eupenicillium pinetorum Stolk
Isolated from meadow soils in the locality Kaltwasser-Turček (Marvanová 1998).

Eupenicillium shearii Stolk et D. B. Scott
Anam: *Penicillium asperum* (Shear) Raper et Thom
Syn: *Penicillium glaucum* Link after Bref.
Isolated from meadow soils in the locality Kaltwasser-Turček (Marvanová 1998).

Eurotium Link: Fr.

Eurotium chevalieri L. Mangin
Anam.: *Aspergillus chevalieri* (L. Mangin) Thom et Church
Isolated from Albic Luvisols (Bernát 1965) as *Aspergillus chevalieri*.

Eurotium pseudoglaucum (Blochwitz) Malloch et Cain
Anam.: *Aspergillus glaucoaffinis* Samson et W. Gams
Syn.: *Aspergillus pseudoglaucus* Blochwitz
Isolated during the storage of wheat corn (Dubovská et al. 1986) as *Aspergillus pseudoglaucus*.

Eurotium repens de Bary
Anam.: *Aspergillus reptans* Samson et W. Gams
Syn.: *Aspergillus repens* (Corda) de Bary
Isolated from forest soils in Tichá, Krížná, Kôprová and Furkotská valleys in the Vysoké Tatry Mts. (Šimonovičová 1992, 1993), from agricultural soils (Braunová 1981), during the storage of wheat corn (Bernát et al. 1983, Dubovská et al. 1986), from the phyllosphere of maize leaves and other agricultural plants (Dubovská 1984) as *Aspergillus repens*.

Fennellia B. J. Wiley et E. G. Simmons

Fennellia flavipes B. J. Wiley et E. G. Simmons

Anam.: *Aspergillus flavipes* (Bainier et Sartory) Thom et Church

Isolated from agricultural soils (Bernát et al. 1984, Braunová 1981), from forest soils in the neighbourhood of Bratislava (Krakovská et al. 2000) and from non-specified soil (Piecková and Jesenská 1999a) as *Aspergillus flavipes*.

Hamigera Stolk et Samson

Hamigera avellanea (Thom et Turesson) Stolk et Samson

Anam.: *Merimbla ingelheimensis* (J. F. H. Beyma) Pitt

Syn.: *Talaromyces avellaneus* (Thom et Turesson) C. R. Benj., *Penicillium avellaneum* Thom et Turesson

Isolated from an altar canvas in a gothic church in Okoličné (Gódyová 2000) as *Merimbla ingelheimensis*.

Merimbla Pitt

Merimbla ingelheimensis (J. F. H. Beyma) Pitt → *Hamigera avellanea* (Thom et Turesson) Stolk et Samsom

Neosartorya Malloch et Cain

Neosartorya fischeri (Wehmer) Malloch et Cain

Anam.: *Aspergillus fischerianus* Wehmer

Isolated from conserved fruit and fruit-juice (Jesenská et al. 1983), from stewed fruit and juice (Jesenská and Petríková 1985), from juice and the surface of stewed fruit which had some signs of sensorical depreciation (Petríková et al. 1985), from equipment used for conserving and final products (Šepitková et al. 1987b), from wooden sculptures and picture canvases from depositories and from indoor air of the Slovak National Museum (Franková et al. 1999, Šimonovičová and Franková 1998), from prefabricated dwellings and wooden substrates (Franková and Šimonovičová 1999a), from drinking water, dwelling and from different materials in depositories and archives (Franková and Šimonovičová 1999b) as *Aspergillus fischeri*.

Paecilomyces Bainier

Paecilomyces carneus (Duché et R. Heim) Brown et Smith

Isolated from soil in Strážovské vrchy Mts. (Kubátová et al. 1996).

Paecilomyces farinosus (Holmsk.) Brown et Smith

Isolated from wood in Pieniny (Kubátová et al. 1996), from mouldy wall in a gothic church in Okoličné (Šimonovičová et al. 2000).

Paecilomyces marquandii (Massee) S. Hughes
Isolated from soil, Magurka hill, Oravská Magura Mts. (Kubátová et al. 1996).

Penicillium Link: Fr.

Penicillium arenicola Chalab.
Isolated from sepulchral monuments of stone in the Crypt of Chatam Sófer in Bratislava (Gódyová 2000, Šimonovičová et al. 2000).

Penicillium atramentosum Thom
Isolated from forest soil in Nízke Tatry Mts. (Kubátová 1990a).

Penicillium brasilianum Bat.
Isolated from spruce forest soil in Nízke Tatry Mts., from soil under alder trees in Oravská Magura Mts. (Kubátová et al. 1996).

Penicillium clavigerum Demelius
Isolated from agricultural soils (Braunová 1981b), from culture contaminant of an antibiotics factory in Slovenská Ľupča (Kubátová et al. 1996).

Penicillium coprobium Frisvad
Isolated from soil in Strážovské vrchy Mts. (Kubátová 1993–1994, Kubátová et al. 1996) as *Penicillium coprophilum*.

Penicillium cyaneum (Bainier et Sartory) Biourge
Isolated from the phyllosphere of maize corn and maize leaves (Dubovská et al. 1982).

Penicillium cyclopium Westling
Syn: *Penicillium verrucosum* Dierckx var. *cyclopium* (Westling) Samson et al.
Isolated from floodplain forest soils in Gabčíkovo (Bučková and Bacigálová 1999) as *Penicillium verrucosum* var. *cyclopium*.
Isolated from the phyllosphere of maize corn and maize leaves (Dubovská, 1981; Dubovská et al., 1982), from Cambizem Stagnogleyic (Pavličková 1994), from different cereals (flour, fine groats, rye, oat and barley corn (Jesenská and Šepitková 1984a, b), from the surface of corn (Šajbidorová et al. 1988), from collections of historical costumes and from the air in depositories of the Slovak National Museum (Šimonovičová and Franková 1998), from wooden sculptures and picture canvases in depositories and from indoor air of the Slovak National Museum (Franková et al. 1999, Šimonovičová and Franková 1998), from drinking water, dwelling and from different objects and materials in depositories and in archives (Franková and Šimonovičová, 1999b) as *Penicillium cyclopium*.

Penicillium flavovirens Cooke et Massee [according to Pitt 1979 an indeterminate name]

Isolated from agricultural soils (Ondrišová and Gašpieriková 1982).

Penicillium fellutanum Biourge

Syn: *Penicillium charlesii* G. Sm.

Isolated from Albic Luvisols (Bernát 1965) as *Penicillium charlesii*.

Isolated from meadow soils in the locality Kaltwasser-Turček (Marvanová 1998) as *Penicillium fellutanum*.

Penicillium geophilum Oudem. apud Oudem. et Koning [according to Pitt 1979 not a *Penicillium*]

Isolated from spruce forest soils (Bernát 1958).

Penicillium griseofulvum Dierckx

Isolated from sepulchral monuments of stone in the Crypt of Chatam Sófer in Bratislava (Šimonovičová a kol. 2000).

Penicillium herquei Bainier et Sartory

Isolated from Albic Luvisols (Bernát 1965).

Penicillium implicatum Biourge

Isolated from Albic Luvisols (Bernát 1965).

Penicillium lanosum Westling

Isolated from soil in Nízke Tatry Mts. (Kubátová et al. 1996).

Penicillium luteum Sopp [according to Pitt 1979 an indeterminate name]

Isolated from forest soils (Vláčiliková 1978), from agricultural soils (Braunová 1981a, Šimonovičová 1980), from the phyllosphere of maize (Dubovská et al. 1986), from Mollic Fluvisol (Ondrišová 1976).

Penicillium megasporum Orpurt et Fennell

Isolated from forest soils (Vláčiliková 1978).

Penicillium melinii Thom

Isolated from soil in Nízke Tatry Mts. (Kubátová et al. 1996), from meadow soils in the locality Kaltwasser-Turček (Marvanová 1998).

Penicillium montanense M. Chr. et Backus

Isolated from humus of peat-bog in the Horná Orava region, from soil under *Pinus mugo* in Nízke Tatry Mts. (Kubátová et al. 1996).

Penicillium nalgiovense Laxa

Isolated from picture canvases (Franková and Šimonovičová 1999a), from different objects and materials in depositories and archives (Franková and Šimonovičová 1999b).

Penicillium purpurogenum Stoll var. *rubrisclerotium* Thom
Isolated from agricultural soils (Braunová 1981).

Penicillium sacculum E. Dale
Syn: *Eladia saccula* (E. Dale) G. Sm.
Isolated from hardwood forest soils in Spišská Magura (Kubátová 1990b) as *Eladia saccula*.

Penicillium smithii Quintan.
Isolates from soil in Chabenec, in Nízke Tatry Mts. (Kubátová et al. 1996).

Penicillium sulfureum Sopp [according to Pitt 1979 a possible synonym of *Penicillium purpurogenum*]
Isolated from spruce forest soils (Bernát 1954, 1958).

Penicillium verruculosum Peyronel
Isolated from agricultural soils (Braunová 1981, Ondrišová and Gašpieriková 1982).

Talaromyces C. R. Benj.

Talaromyces avellaneus Thom et Turesson → *Hamigera avellanea* (Thom et Turesson) Stolk et Samson

Talaromyces bacillisporus (Swift) C. R. Benj.
Anam.: *Geosmithia swiftii* Pitt
Isolated from non-specified soil from a depth of 0–5 cm in the neighbourhood of Bratislava and Poprad (Jesenská and Piecková 1990a, b, 1991), from non-specified soils of Slovakia (Jesenská et al. 1992a, 1994, Jesenská and Piecková 1994a, b, 1995a, b, Piecková et al. 1992, Piecková et al. 1994), from garden, forest and agricultural soils in the neighbourhood of Bratislava (Jesenská et al. 1992b), from soil of a flower bed in a private garden (Jesenská and Piecková 1993, 1994a, Jesenská et al. 1994, Piecková et al. 1994) as *Talaromyces bacillisporus*.

Talaromyces emersonii Stolk
Anam.: *Geosmithia emersonii* (Stolk) Pitt
Isolated from non-specified soils of Slovakia (Jesenská et al. 1992a), from garden, forest and agricultural soils in the neighbourhood of Bratislava (Jesenská et al. 1992c), from soil of a flower bed in a private garden (Jesenská and Piecková 1993), from three different beds of a private garden which had been fertilised with organic fertilisers (Jesenská et al. 1992c) as *Talaromyces emersoni*.

Table 1. Species of microscopic fungi with a scarce or rare occurrence.

Fungi	Occurrence of species		
	Soil	Food-stuffs	Other sources
Aspergillus duricaulis Raper et Fennell			*
A. flavus Link var. *columnaris*		*	
A. melleus Yukawa			*
A. niger var. *cinnamomeus* (Schieman) Thom et Raper	*		
A. parvulus G. Sm.	*		
A. violaceo-fuscus Gasperini	*		
Emericella rugulosa (Thom et Raper) C. R. Benj.	*		
Eupenicillium pinetorum Stolk	*		
E. sheari Stolk et D. B. Scott	*		
Eurotium chevalieri L. Mangin	*		
Eurotium pseudoglaucum (Blochwitz) Malloch et Cain			*
Merimbla ingelheimensis (J. F. H. Beyma) Pitt			*
Paecilomyces carneus (Duché et Heim) Brown et Smith	*		
P. marquandii (Massee) S. Hughes	*		
Penicillium arenicola Chalab.			*
P. atramentosum Thom	*		
P. brasilianum Bat.	*		
P. coprobium Frisvad	*		
P. cyaneum (Bainier et Sartory) Biourge			*
P. flavovirens Cooke et Massee	*		
P. geophilum Oudem. apud Oudem. et Koning	*		
P. griseofulvum Dierckx			*
P. herquei Bainier et Sartory	*		
P. implicatum Biourge	*		
P. lanosum Westling	*		
P. megasporum Orpurt et Fennell	*		
P. montanense M. Chr. et Backus	*		
P. purpurogenum Stoll var. *rubrisclerotium* Thom	*		
P. sacculum E. Dale	*		
P. smithii Quintan.	*		
Σ 30	22	1	7
	73.3 %	3.3 %	23.7 %

Other sources: patients with oncological diceases, cotton, stored wheat, stone monuments, phyllosphere of agricultural plants.

Table 2. Species of microscopic fungi not listed in the Checklist of non-vascular and vascular plants of Slovakia, part Fungi (Lizoň, Bacigálová, 1998).

Fungi	Occurrence of species		
	Soil	Food-stuffs	Other sources
Aspergillus clavatus Desm.	*	*	*
A. janus Raper et Thom		*	*
A. parasiticus Speare		*	*
A. penicillioides Speg.			*
Byssochlamys fulva Olivier et Smith	*	*	
B. nivea Westling	*	*	
Dichotomomyces cejpii (Milko) D. B. Scott	*		
Eupenicillium javanicum (J. F. H. Beyma) Stolk et D. B. Scott	*		
Fennellia flavipes B. J. Willey et E. G. Simmons	*		
Paecilomyces farinosus (Holmsk.) Brown et Smith			*
Penicillium clavigerum Demelius	*		*
P. cyclopium Westling	*	*	*
P. fellutanum Biourge	*		
P. luteum Sopp	*		*
P. melinii Thom	*		
P. nalgiovense Laxa			*
P. sulphureum Sopp	*		
P. verruculosum Peyronel	*		
Talaromyces bacillisporus (Swift) C. R. Benj.	*		
T. emersonii Stolk	*		
Σ 20	15	6	9
	75.0 %	30.0 %	45.0 %

Other sources: air in factory, different material in depositories and archives (wooden sculpture, picture canvases, frames), drinking water, dwelling, phyllosphere of agricultural plants, stored wheat, culture contaminant from an antibiotics factory.

DISCUSSION

Due to its ecological features (suitable amount of organic matter, moisture, temperature, protection from sunshine) soil is a natural biotope of microscopic fungi and is therefore the richest in them, too.

The total number of 50 species of microscopic fungi which are not listed in the Checklist of non-vascular and vascular plants of Slovakia (Lizoň and Bacigálová 1998) has been divided into two groups.

The first group (Tab. 1) represents those microscopic fungi, which have been isolated in Slovakia only once. So we can consider them to be scarce

or rare. From the 30 species 22 were 22 isolated from different soils (forest, agricultural and meadow), 1 species from foodstuffs and 7 species from other sources (such as material from patients with oncological diseases, cotton, stored wheat, stone monuments, phyllosphere of different agricultural plants). More than half of them (16 species) belongs to the genus *Penicillium* (*P. arenicola, P. atramentosum, P. brasilianum, P. coprobium, P. cyaneum, P. flavovirens, P. geophilum, P. griseofulvum, P. herquei, P. implicatum, P. lanosum, P. megasporum, P. montanense, P. purpurogenum* var. *rubrisclerotium, P. sacculum* and *P. smithii*). Scarce or rare species of the genus *Aspergillus* can be considered *A. duricaulis, A. flavus* var. *columnaris, A. melleus, A. niger* var. *cinnamomeus, A. parvulus,* and *A. violaceo-fuscus*. The list is completed with the species *Emericella rugulosa, Eupenicillium pinetorum, E. sheari, Eurotium chevalieri, E. pseudoglaucum, Merimbla ingelheimensis, Paecilomyces carneus* and *P. marquandii.*

The second group (Tab. 2) represents species of microscopic fungi which are isolated more often than in the first case. Among the 20 species of microscopic fungi again the genus *Penicillium* dominates with 9 species (*P. clavigerum, P. cyclopium, P. fellutanum, P. luteum, P. melinii, P. nalgiovense, P. sulphureum* and *P. verruculosum*) and the genus *Aspergillus* with 4 species (*A. clavatus, A. janus, A. parasiticus,* and *A. penicillioides*). Species of the genera *Byssochlamys*, *Dichotomomyces*, *Eupenicillium*, *Eurotium*, *Paecilomyes* and *Talaromyces* are represented once or twice. Of the 20 species 15 were isolated from soil, 6 species from foodstuffs and 9 species from other sources (such as air in a factory, different material in depositories and archives, drinking water, dwelling, phyllosphere of different agricultural plants and corn, stored wheat, culture contaminant in an antibiotics factory). Out of all species of microscopic fungi (Tab. 1 and 2) only the species *Aspergillus clavatus* and *Penicillium cyclopium* were isolated from soil, foodstuffs as well as other sources.

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