

First records of *Pholiota subochracea* and *Pholiota elegans* in the Czech Republic

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The rare species *Pholiota subochracea* (= *P. nematolomoides*) was found on three localities in south Bohemia (Šumava Mts. and Novohradské hory Mts.) in the year 1995. These records represent the first data on its occurrence in the Czech Republic. The recently described species *Pholiota elegans* Jacobsson 1990 was found in south Bohemia (Šumava Mts., Spáleníště hill) in the year 1996. It is the first record of this fungus outside the Nordic countries (Sweden, Norway, Finland). Thorough descriptions of macro- and microcharacters based on the author's own collections are given together with drawings of important microcharacters, colour photographs and a discussion on ecology, distribution and taxonomy of both species.

Key words: *Pholiota subochracea*, *Pholiota elegans*, Czech Republic, first records, taxonomy, ecology, distribution.

Holec J. (1997): První nálezy druhů *Pholiota subochracea* a *Pholiota elegans* v České republice. – *Czech Mycol.* 50: 45–56

Vzácný druh šupinovky *Pholiota subochracea* (= *P. nematolomoides*) byl v roce 1995 nalezen na třech lokalitách v jižních Čechách, ležících na Šumavě a v Novohradských horách. Jde o první nálezy tohoto druhu v České republice. Nedávno popsáný druh *Pholiota elegans* Jacobsson 1990 byl sbírán v roce 1996 na lokalitě Spáleníště u Českých Žlebů na Šumavě. Je to nejen první nález pro Českou republiku, ale zároveň i pro Evropu mimo Švédsko, Norsko a Finsko, kde byl druh rozeznán a popsán. U obou druhů jsou uvedeny podrobné popisy makro- a mikroznaků, založené na studiu plodnic nalezených autorem článku a M. Beranem. Popisy jsou doprovázeny kresbami důležitých mikroznaků, barevnými fotografiemi a diskusí o ekologii, rozšíření a taxonomii obou druhů.

INTRODUCTION

In the period 1992–1996 I studied the taxonomy of *Pholiota* species growing in the Czech Republic as a subject of my doctoral thesis. Preliminary results were published in two small contributions (Holec 1995, 1996) and doctoral thesis (Holec 1997), all written in Czech. During the field work many interesting, critical or extremely rare *Pholiota* species were found. Some of these species were new for the Czech Republic. The finds of *Pholiota subochracea* (A. H. Smith) A. H. Smith et Hesler and *Pholiota elegans* Jacobsson belong to the most interesting ones due to their rare occurrence in Europe. Therefore, records of these two species are published in the present paper.

MATERIAL AND METHODS

Descriptions of macrocharacters are based on the author's own finds, the given microcharacters are based on all specimens mentioned in the paragraphs "Specimens studied". Microcharacters were analysed using a 5% solution of KOH and an aqueous solution of Congo Red. Fruitbodies collected by the author are deposited in the PRM herbarium (Mycological Department, National Museum, Praha). Several specimens were kindly provided by Mgr. M. Beran from the CB herbarium (Museum of South Bohemia, České Budějovice) and Prof. M. Moser from IB (Herbarium, Institut für Botanik, Universität Innsbruck).

RESULTS AND DISCUSSION

Pholiota subochracea (A. H. Smith) A. H. Smith et Hesler

Hypholoma subochraceum A. H. Smith, Mycologia 36: 250, 1944. – *Pholiota subochracea* (A. H. Smith) A. H. Smith et Hesler, The North American species of Pholiota: 153, 1968.

Syn.: *Nematoloma subochraceum* (A. H. Smith) A. H. Smith, Mycologia 38: 502, 1946. – *Dryophila nematolomoides* Favre, Schweiz. Z. Pilzk. 36: 67, 1958. – *Pholiota nematolomoides* (Favre) M. Moser, Röhrlinge und Blätterpilze, ed. 3: 243, 1967 (in Gams H., Kleine Kryptogamenflora, vol. 2b/2).

Selected icones: Favre (1958): Table 5. – Moser and Jülich, Farbatlas der Basidiomyceten, part III: Pholiota 1. – Dähncke (1993): p. 627. – Breitenbach and Kränzlin (1995): Fig. 435.

Illustrations: Fig. 1, Fig. 4

Description (according to my collection: PRM 890574). Fruitbodies grew in a small fascicle. Pileus 1–3.5 cm, almost hemisphaerical when young, with involute margin, convex at maturity, with a low obtuse umbo, flesh thin, surface smooth, slightly viscid when moist but not apparently glutinous. Pileus cuticle ochre-brown in young fruitbodies, light yellow at margin at maturity, towards centre becoming darker, yellow-ochre. The pileus is slightly hygrophanous, the moist pileus margin having an olivaceous tinge. Pileus surface covered with unregularly distributed minute ochre-brown to red-brown patches. Lamellae very dense, with lamellulae, 0.3–0.5 cm broad, even or slightly ventricose, emarginate, dull yellow when young, light yellow-brown at maturity. Stipe 4–7 × 0.3–0.4 cm, cylindric, hollow at maturity, often curved, smooth in upper part, light yellow, towards base ochre-brown, covered with white-yellow remnants of velum forming fissile floccose patches; base of stipe white tomentose, velum light yellow in young fruitbodies, later missing. Context light yellow to yellow in pileus, yellow in upper part of stipe, rusty brown in lower part. Taste mild, later slightly bitter, smell none. Spore print brown.

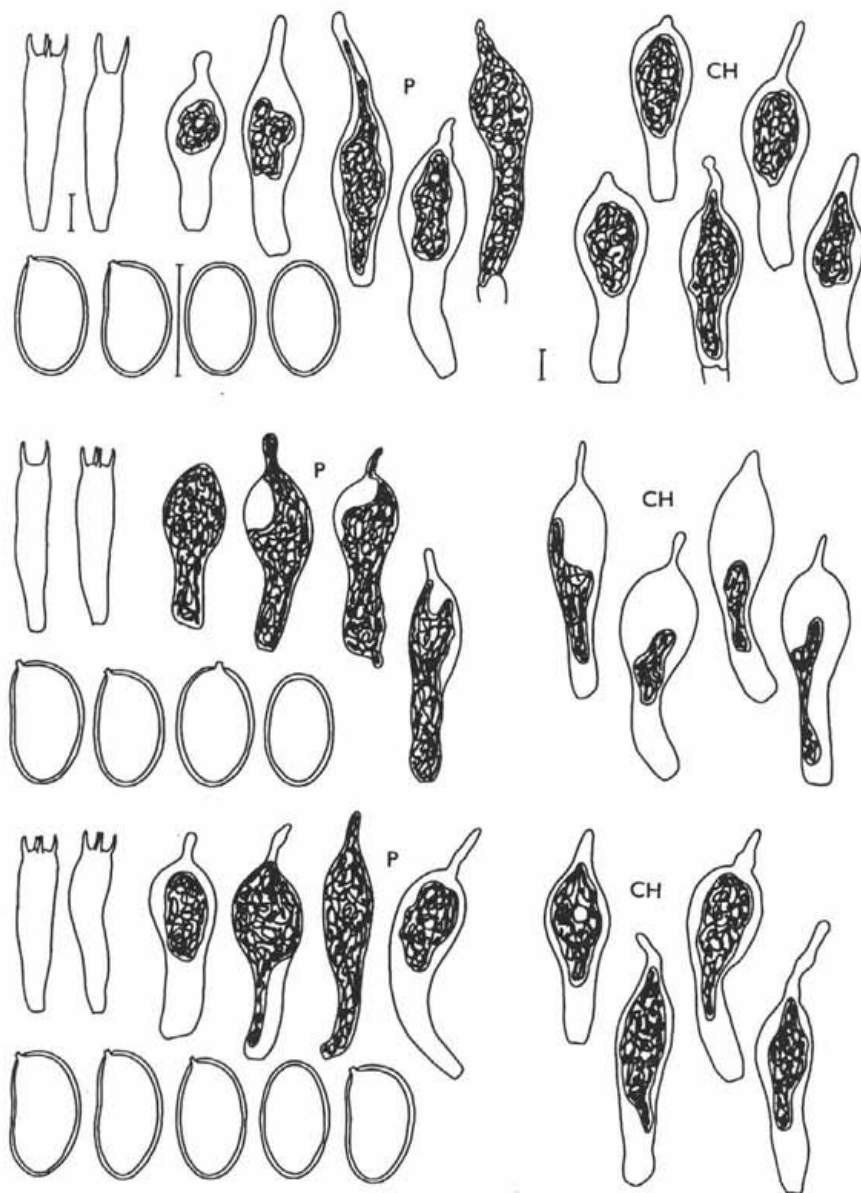


Fig. 1. *Pholiota subochracea* (spores, basidia, cheilocystidia, pleurocystidia).

- Šumava Mts., margin of Mrtvý luh peat bog, 22. VIII. 1995, leg. J. Holec (PRM 890574).

- Novohradské hory Mts., Žofinský prales virgin forest, 26. VIII. 1995, leg. M. Beran (CB, as *P. nematolomoides*).

- Šumava Mts., 0,5 km SSE of Černý Kříž railway station, 27. VIII. 1995, leg. M. Beran (CB, as *P. nematolomoides*).

Explanations: P: pleurocystidia, CH: cheilocystidia. Scale bar = 5 μ m. Ill. J. Holec.

Spores 5-5,8(-6) × (2,7-)3-3.7(-4) μm, ellipsoid to ovoid-ellipsoid, in side view some of them slightly phaseoliform; wall thin, yellow-brown, smooth; germ pore absent. Basidia 21-27 × 4.5-6 μm, cylindric to narrowly clavate, clamped, 4-(2-)-spored, sterigmata 3-6 μm. Cheilocystidia of the chrysocystidia type, filled with a refractive inclusion colouring yellow in KOH or NH₄OH, 31-49 × 8-12 μm, clavate, cylindric-clavate, clavate-fusiform, in upper part mostly with narrow cylindric protuberances (mucronate cystidia), clamped. Pleurocystidia of the same character as the cheilocystidia. Lamellar trama regular, made up of parallel to subparallel hyphae 4.5-15 μm broad, individual cells cylindric or slightly inflated, clamped, subhymenium non-gelatinous, formed by densely packed interwoven hyphae 3-4.5 μm broad. Pileus cuticle a cutis, 2-layered, upper layer made up of densely arranged parallel to subparallel hyphae 2-3 μm broad, with membranal pigment and yellow incrustations not soluble in KOH, lower layer made up of sparsely arranged hyphae 6-9 μm broad, without incrustations. Clamps present. Stipe cuticle a cutis of densely arranged cylindric hyphae 3-6 μm broad, brown-ochre coloured, with prominent membranal pigment and incrustations, sometimes also with a vacuolar pigment, clamps present.

Ecology. *Pholiota subochracea* was found on dead wood of *Picea abies* and in one case on strongly decayed wood of a conifer (*Picea abies* or *Pinus sylvestris*). The species prefers wood in later stages of decay and occurs on fallen trunks and branches. All finds from the Czech Republic originate from the montane belt (elevation 740-780 m a.s.l.). Concerning the vegetation, *P. subochracea* was found in a montane mixed wood (*Fagus*, *Abies*, *Picea*) with the character of a virgin forest (Žofinský prales), in a spruce forest on humid soil (Černý Kříž in the Šumava Mts.) and in a wood stand with *Pinus rotundata*, *Pinus sylvestris*, *Picea abies* and *Betula pubescens* (at the margin of Mrtvý luh peat bog). In other European countries the species is reported from wood of *Picea abies* (Jacobsson 1990; herbarium specimens from IB: see Specimens studied), *Pinus cembra* (Favre 1958, as *P. nematolomoides*) and probably also *Pinus mugo* (Breitenbach and Kränzlin 1995, as *P. nematolomoides*). The records in North America originate from decaying conifer logs (Smith and Hesler 1968). According to the finds from the Czech Republic, the species prefers stands with presence of dead wood of *Picea abies* in later stages of decay, especially forests of natural or seminatural character where fallen trunks and logs are present. Besides, *P. subochracea* was found in the montane belt where the climate is relatively humid. This fact agrees well with the conclusions of Jacobsson (1990) that *P. subochracea* "seems to prefer a humid climate. . . , . . . in central Europe only found in mountainous areas".

Distribution. *Pholiota subochracea* seems to be very rare in the Czech Republic. The first data on its occurrence in the Czech Republic are included in my previous paper (Holec 1996). There are no specimens of this species in Czech herbaria collected in the past. The three finds reported in this paper originate from

mountainous areas in south Bohemia – Šumava Mts. and Novohradské hory Mts. In my opinion, the species may be found on other localities in the above areas where habitat conditions are suitable (especially humid climate, high amount of decaying wood of conifers) and probably also in other mountainous regions of the Czech Republic.

Pholiota subochracea is relatively common in southwestern Sweden and isolated records are known from other parts of Sweden as well as from Norway and Finland (Jacobsson 1990; distribution map included). In other European countries *Pholiota subochracea* is reported under the name *Pholiota nematolomoides* (Favre) M. Moser. The species was found in Switzerland at an altitude of 1350 m (Breitenbach and Kränzlin 1995: Berner Voralpen) and in the alpine belt at an altitude of 2000 m (Favre 1958: Alps). It is also known from Germany where the finds are located in mountains too – the Schwarzwald and Bayerischer Wald (Krieglsteiner 1982, 1991). The finds from Bayerischer Wald are located close to the Czech records from the Šumava Mts. – both Czech and German finds were made in one mountain range on the border between the two countries. Altitude and habitat of the finds from Bayerischer Wald are also similar to Czech records (Luschka 1993: 740–780 m a.s.l., spruce forest on peaty soil: "Aufichtenwald"). *Pholiota subochracea* is known from montane regions of Austria (Krieglsteiner 1991; herbarium specimens from Tirol: IB 80/703, IB 82/317 collected by M. Moser). These data clearly show that *Pholiota subochracea* has a boreal-montane to boreal-subalpine distribution pattern in Europe. In North America the species is reported from the Pacific Northwest (Idaho, Oregon, Washington; see Smith and Hesler 1968).

Discussion. *Pholiota subochracea* is a rare fungus and only few mycologists had an opportunity to see it in nature. Moreover, the species is rather inconspicuous and probably overlooked due to its resemblance to some *Hypholoma* species. However, *P. subochracea* is recognized by small fruitbodies, brown spore print, yellow-brown lamellae at maturity and relatively small spores having no germ pore. The presence of numerous chrysocystidia (both pleuro- and cheilocystidia) places the species within *Pholiota* subg. *Pholiota* sensu Jacobsson (1990) where it has a rather isolated position due to the appearance of its fruitbodies. The species is known as *Pholiota nematolomoides* (Favre) M. Moser in Europe. Favre described his species according to fruitbodies found in Switzerland at an altitude of 2000 m on wood of *Pinus cembra*. It is rather interesting that no *Pholiota* species described by Fries fits it, although according to Jacobsson (1990) the species is common in Femsjö.

After careful study of some herbarium specimens and type material of *Pholiota subochracea* (A. H. Smith) A. H. Smith et Hesler from the MICH herbarium, Jacobsson (1990) came to the conclusion that this American fungus is identical with *Pholiota nematolomoides* (Favre) M. Moser. As the description of *Pholiota*

subochracea by Smith and Hesler (1968) agrees well with finds from the Czech Republic, I agree with Jacobsson's opinion. Thus, the correct name for this species is *Pholiota subochracea* (A. H. Smith) A. H. Smith et Hesler that was published already in 1944 (as *Hypholoma subochraceum*).

Specimens studied. Czech Republic: Šumava Mts., margin of Mrtvý luh peat bog near Černý Kříž railway station, 740 m a.s.l., strongly decayed wood of a conifer (*Picea abies*, *Pinus sylvestris*?), 22. VIII. 1995, leg. J. Holec, JH 184/95 (PRM 890574). – Šumava Mts., 0,5 km SSE of Černý Kříž railway station, 750 m a.s.l., decayed log of *Picea abies*, 27. VIII. 1995, leg. M. Beran (CB, as *P. nematolomoides*). – Novohradské hory Mts., Žofínský prales virgin forest, 750–780 m a.s.l., decayed stump of *Picea abies*, 10. IX. 1995, leg. M. Beran (CB, as *P. nematolomoides*); decayed log of *Picea abies*, 26. VIII. 1995, leg. M. Beran (CB, as *P. nematolomoides*). Austria: Tirol, Gnadenwald, *Picea abies*, 30. VIII. 1980, leg. et det. M. Moser (IB 80/703, as *P. nematolomoides*). – Tirol, Angerberg, *Picea abies*, 10. IX. 1982, leg. et det. M. Moser (IB 82/317, as *P. nematolomoides*).

Pholiota elegans Jacobsson

Pholiota elegans Jacobsson, Windahlia 19: 72, 1990.

Illustrations: Fig. 2, Fig. 5

Description (according to my collections: PRM 889476, 889455). Fruitbodies are growing in fascicles or small groups. Pileus 2–7 cm, hemisphaerical with involute margin when young, then convex, in some fruitbodies with a low obtuse umbo, margin covered with fine and loosely arranged tomentose velum when young, the velum later missing. Pileus cuticle strongly viscid to glutinous in moist weather, white-yellow or light yellow at margin, yellow to yellow-ochre towards the centre, almost yellow-orange when young, innately radially striate, surface covered with irregularly distributed, minute and innate scales that are rusty-ochre to cinnamon-brown, the scales present in some fruitbodies only, sometimes swollen up in the gelatinous covering of the pileus or removed by rainfall. Lamellae dense, with lamellulae, 0.4–0.8 cm broad, even or slightly ventricose, emarginate and decurrent with a small tooth, yellow-white to light yellow when young, then light yellow or light yellow-ochre, at maturity light ochre-brown, edge even, somewhat yellower than the lamellae surface, almost lemon-yellow when young. Stipe 2.5–6 × 0.3–0.9 cm, cylindric, base sometimes slightly swollen, connected with pileus margin by white arachnoid velum later forming an almost indistinct annular zone, the zone missing and absent at maturity; above the velum zone the stipe is white or yellow-white, smooth or finely floccose, below it is white or whitish, at the base slightly ochre with an orange flush, finely yellow-rusty floccose to fibrillose, the upper part light yellow at maturity, the lower part ochre to rusty-ochre, finely rusty-yellow to rusty-ochre floccose-fibrillose, becoming rusty-ochre after touching the stipe

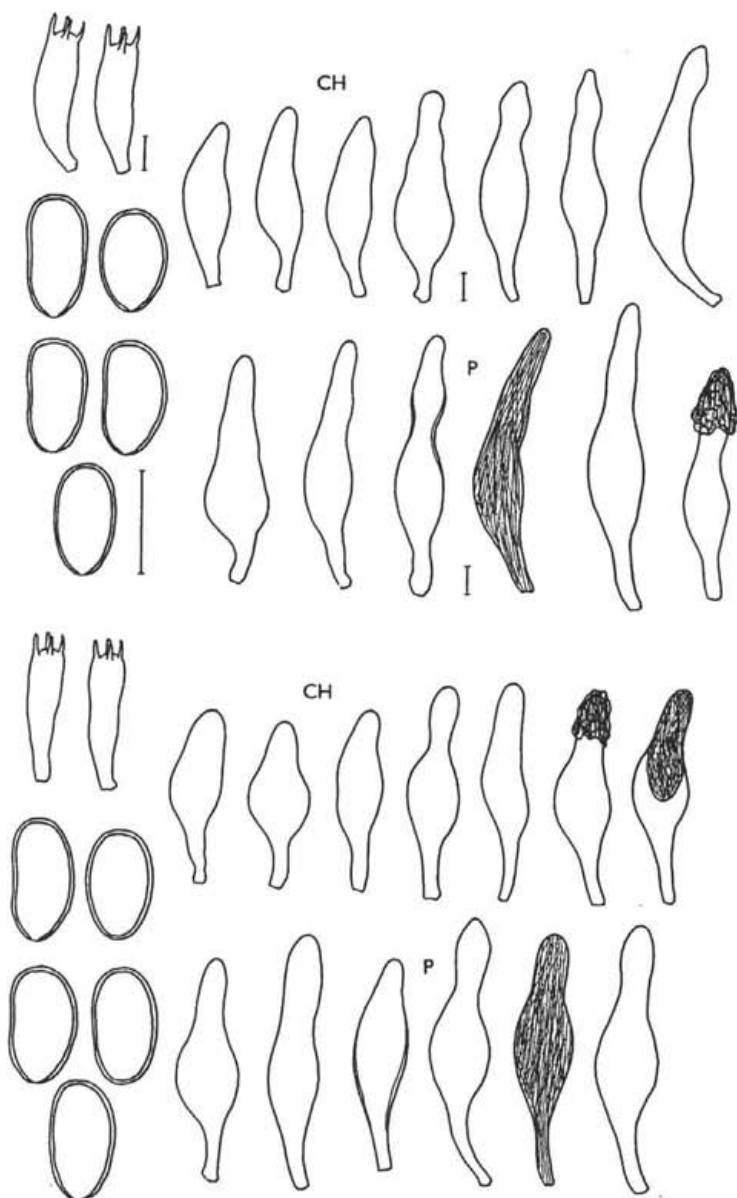


Fig. 2. *Pholiota elegans* (spores, basidia, pleurocystidia, cheilocystidia).

– Šumava Mts., Spáleníště hill near the village of České Žleby, 11. X. 1996, leg. J. Holec, (PRM 889455).

– Šumava Mts., Spáleníště hill near the village of České Žleby, 11. X. 1996, leg. J. Holec, (PRM 889476).

Explanations: P: pleurocystidia, CH: cheilocystidia. Scale bar = 5 μ m. Ill. J. Holec.

surface. Context light yellow in pileus, sometimes with a grey flush, deeper yellow below the pileus surface, in stipe yellow-white to lemon yellow below the surface, in central part yellow, in stipe base yellow-ochre to rusty-brown. Taste mild, smell indistinct or slightly "fleshy-gummose". Spore print brown (Moser 1978: B7).

Spores $5-6(-6.5) \times (2.7-)3-3.5(-3.7) \mu\text{m}$, ellipsoid to ovoid-ellipsoid, in side view slightly but distinctly phaseoliform, wall ochre-brown, smooth, with minute and narrow germ pore (at most $0.4-0.6 \mu\text{m}$ broad), the pore is indistinct in some spores. Basidia $16-25 \times 6-8 \mu\text{m}$, cylindric or narrowly clavate, sometimes slightly narrower in the middle part, 4- or 2-spored, with clamps at base. Cheilocystidia $(27-)31-54 \times 8-12 \mu\text{m}$, forming a sterile band on the edge, clavate when young, then lageniform-fusiform to narrowly utriform with prolonged basal part, in upper part often slightly broadened, thin-walled, hyaline or filled with a regularly distributed yellow pigment, sometimes covered with prominent yellow-ochre incrustation ("cap") in the upper part, clamped. Pleurocystidia numerous, $45-61 \times 9-12 \mu\text{m}$, mostly lageniform-fusiform but also cylindric-fusiform or narrowly utriform, thin-walled but exceptionally with slightly thickened wall (up to $1.5 \mu\text{m}$) in the middle part, hyaline or filled with a regularly distributed yellow pigment, sometimes covered with prominent yellow-ochre incrustation ("cap") in the upper part, clamped. Lamellar trama regular, made up of parallel hyphae, individual cells cylindric or slightly inflated, in the middle part $4-13 \mu\text{m}$ broad, near the subhymenium only $2-3 \mu\text{m}$ broad, subhymenium distinctly gelatinous, consisting of loosely arranged interwoven and branched hyphae. Clamps present. Pileus cuticle an ixocutis, 3-layered, upper layer thin, made up of densely arranged, parallel, $2-4.5 \mu\text{m}$ broad hyphae, distinctly yellow coloured, with a membranal and incrusting pigment; middle layer relatively thick, strongly gelatinous, formed by loosely arranged, parallel to subparallel, $1-3.5 \mu\text{m}$ broad hyphae, with hyaline content but distinctly yellow incrustated; lower layer thin, yellow coloured, made up of densely arranged parallel to subparallel, $3-5 \mu\text{m}$ broad hyphae, densely covered by yellow-rusty incrustations. Clamps present. Stipe cuticle a cutis consisting of densely arranged cylindric and parallel $2-4 \mu\text{m}$ broad hyphae, with membranal and incrusting pigment; clamps present.

Ecology. Only two finds of *Pholiota elegans* are known from the Czech Republic, both from the same locality (Šumava Mts., Spáleníště Hill near the village of České Žleby). In one case the fruitbodies grew in decaying needles and leaves under *Picea abies*, *Acer pseudoplatanus* and *Fraxinus excelsior* (montane scree wood), in the second case on a fallen trunk of *Fagus sylvatica* in later stage of decay (mixed montane wood with predominance of *Fagus*). The vegetation has a virgin forest character and the area is protected as the first (strictly natural) zone of the Šumava National Park. The Spáleníště locality is characterised by a great amount of fallen trunks of *Fagus sylvatica*, *Acer pseudoplatanus*, *Ulmus glabra*, *Fraxinus excelsior*, *Abies alba*, and *Picea abies*. The altitude of both finds amounts 900-920 a.s.l.

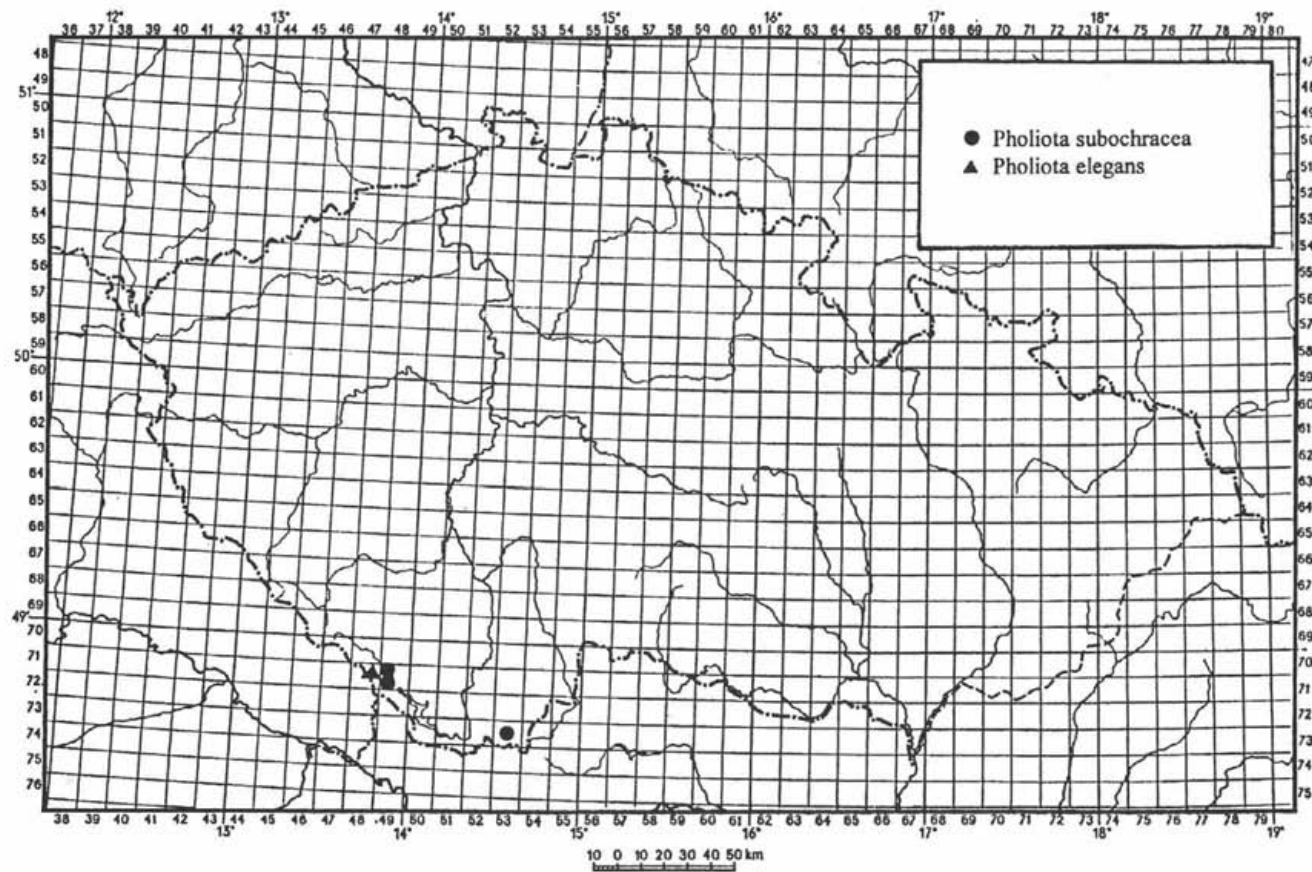


Fig. 3. Localities of *Pholiota subochracea* and *Pholiota elegans* in the Czech Republic.

According to Jacobsson (1990), *P. elegans* occurs on "old logs, branches and other wood debris, bark etc. on the ground, generally of deciduous wood but also *Picea*".

Distribution. Up to now, *Pholiota elegans* is known only from 14 localities scattered throughout Sweden, Norway and Finland (see distribution map published by Jacobsson 1990) and occurs abundantly at many of them. As there are no literature data on its occurrence in other countries, my finds seem to be the first ones outside the Nordic countries. Both Czech finds originate from the same locality (south Bohemia, Šumava Mts., NE slope of the Spáleníště hill near the České Žleby village) and their distance is about 400 m. *Pholiota elegans* is included into the fungi guide by Courtecuisse and Duhem (1994: 352). However, R. Courtecuisse confirmed me that the species is not known from France.

Discussion. *Pholiota elegans* was recently described as a new species (Jacobsson, Windahlia 19: 72, 1990) and its status was confirmed by negative results of compatibility tests with monosporic strains of *P. lenta* and *P. lubrica* (Jacobsson 1990: 74). According to Jacobsson (1990), *P. elegans* differs from the closely related and similar species *P. lubrica* in having smaller spores (see Tab. 1) and the mostly yellow colour of the pileus, and from *P. spumosa* by its spore shape (*P. spumosa*: ovoid, *P. elegans*: slightly phaseoliform in side view).

Table 1. Comparison of spore size in *P. lubrica* and *P. elegans*

	<i>Pholiota lubrica</i>	<i>Pholiota elegans</i>
Jacobsson (1990)	6-7.5 × 3-4 μm	5-6.5(-7) × 3-3.5(-4) μm
Holec (1997)	(5.3-)-5.8-7.5 × (3-)-3.3-4(-5) μm	5-6(-6.5) × (2.7-)-3-3.5(3.7) μm

All macro- and microcharacters of fruitbodies found in the Czech Republic agree well with Jacobsson's description (Jacobsson 1990). To be sure, I sent several fruitbodies to S. Jacobsson for revision, who unambiguously confirmed that my fruitbodies represent his species *Pholiota elegans*.

The finds of *P. elegans* in the Czech Republic are important from several points of view. They represent the first records outside Scandinavia and confirm that *P. elegans* is a good species, because fruitbodies found in the Czech Republic differ from all *Pholiota* species known in Central Europe (see Holec 1996, 1997). The species seems to be very rare and is probably also overlooked or confused with other species, especially *P. lubrica*. In the PRM herbarium, where a rich collection of *Pholiota* species found in several European countries is deposited, *P. elegans* was not represented although I revised all specimens labelled *P. lubrica* or *P. lenta*, which the species could have been filled under. Moreover, I have studied the mycoflora of natural woods in the Šumava mountains as well as other areas

of the Czech Republic for more than 10 years and I never found such a fungus before. Therefore, during investigation of natural forests with a great amount of dead wood of deciduous trees (especially in the montane belt), attention should be paid to this nice species that could be commoner than we think on the basis of few recent records. I expect that *P. elegans* will be found in other countries of Central, West and East Europe too.

Specimens studied. Šumava Mts., Spáleníště hill near the village of České Žleby, in fallen leaves and needles under *Picea abies*, *Acer pseudoplatanus* and *Fraxinus excelsior*, 920 m a.s.l., 11. X. 1996, leg. J. Holec, JH 669/96 (PRM 889476); fallen decaying trunk of *Fagus sylvatica*, 900 m a.s.l., 11. X. 1996, leg. J. Holec, JH 682/96 (PRM 889455).

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Fig. 4. 1) *Pholiota subochracea*, Šumava Mts., margin of Mrtvý luh peat bog, 22. VIII. 1995, leg. J. Holec (PRM 890574). Detail of mature fruitbodies.



Fig. 5. *Pholiota elegans*, Šumava Mts., Spáleníště hill near the village of České Žleby, 11. X. 1996, leg. J. Holec, (PRM 889476). Young fruitbodies. Photo J. Holec.