

## ***Calicium parvum* (Caliciaceae) – a new calicioid lichen to the Czech Republic**

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### **Abstract**

*Calicium parvum* is reported as new to the Czech Republic. Notes about ecology and chorology are given for *C. parvum* and the allied species *C. pinastri* and *C. glaucellum*. Localities of *C. parvum* and *C. pinastri* are included and a map of their distribution in the Czech Republic is attached.

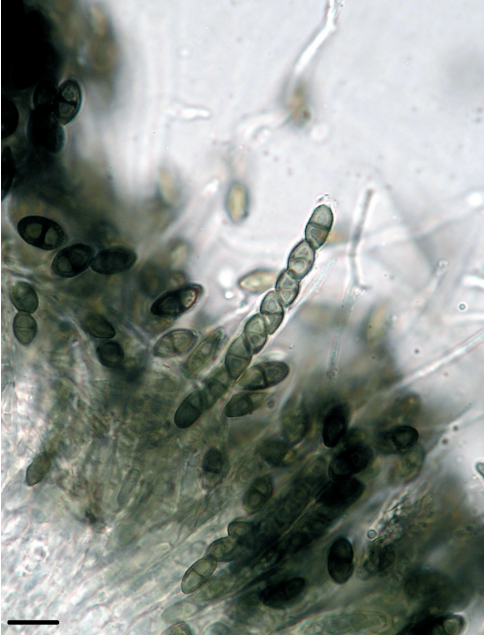
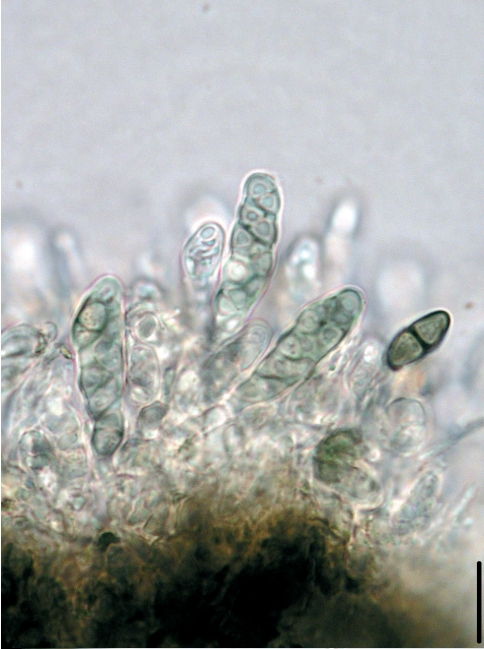
**Key words:** lichenized fungi, Lecanorales, *Calicium pinastri*, *Calicium glaucellum*, distribution, Central Europe

During the phytocenological survey of pine forests in the Třeboňsko basin area (South Bohemia) in 2003 (KUČERA et al. 2006) I collected an inconspicuous *Calicium* species, which did not match description of any member of the genus known from the Czech Republic. Subsequently it was identified as *C. parvum*. Additionally I found it at further localities in pine forests of south and southwest Bohemia. It is assumed that *C. parvum* – although a rare species – may be overlooked in suitable habitats.

*Calicium parvum* has been recorded only from Northern Hemisphere so far, predominantly from the Boreal zone. Within Eurasia it is known from Fennoscandia (ALSTRUP 1994, SANTESSON et al. 2004, TIBELL 1999a), eastern and central part of the continent (Russia – HERMANSSON & PYSTINA 2004, HIMELBRANT et al. 2001, LEBEDEVA 2004, PARN 1986, PYSTINA 2001, TARASOVA 2001, TIBELL 1975; Estonia – LÖHMUS 1998; Lithuania – MOTIEJŪNAITE et al. 1998; Ukraine – KONDRATYUK et al. 1998; Poland – JANDO 2000; Austria – HAFELLNER & TÜRK 2001; Germany – WIRTH 1994), southern and western Europe (Slovenia – SUPPAN et al. 2000; Spain – LLIMONA & HŁADUN 2001; France – BRICAUD et al. 1993; Scotland – PURVIS et al. 1992). From North America it has been reported by FRYDAY et al. (2001), GOWARD (1999) and TIBELL (1975).

The examined specimens of *C. parvum* are characterized by a thin, grey to greenish grey, verrucose thallus and by black, shiny ascomata, 0.4–0.9 mm high (Třeboňsko basin 0.4–0.6 mm; Bohemian Forest, Novohradské hory Mts. 0.5–0.9 mm) with whitish pruina (mainly) on the rim of lenticular capitulum. Asci are clavate, with biserially arranged spores (8–11 × 3.5–5 µm) (Fig. 1). Black conidiomata are abundantly developed on most of specimens (conidia ellipsoidal, 1.5–2.5 × 0.8–1.5 µm).

In Eurasia *Calicium parvum* grows mostly on bark of *Pinus sylvestris*, less frequently also on *Abies pectinata* (France) and *Picea abies*. In North America it has been collected on *Abies balsamea* and *Picea mariana*. In the Czech Republic I found it exclusively on bark of



**Fig. 1.** (top left) *Calicium parvum* – clavate asci (one with distinct long stalk) and mature spore. Bar = 10  $\mu$ m. (Herb. Peksa No. 152).

**Fig. 2.** (top right) *C. pinastri* – cylindrical asci with uniseriately arranged spores and mature spore. Bar = 10  $\mu$ m. (Herb. Peksa No. 240).

**Fig. 3.** (left) *C. glaucellum* – cylindrical ascus with uniseriately arranged (mature) spores. Bar = 10  $\mu$ m. (Herb. Palice No. 1485). (General aspect of thalli and apothecia of all the species is captured in TIBELL 1999a.)

*P. sylvestris* in natural (relict) as well as managed pine forests. *C. parvum* was encountered mainly in habitats with relatively high atmospheric humidity – in humid pine forest with dominance of *Molinia* sp. in Třeboňsko basin (see KUČERA et al. 2006), in full-grown managed pine, pine-spruce or relict pine forests in mountain regions (often in valleys). JOHANSSON & GUSTAFSSON (2001) emphasize relative abundance of *C. parvum* in the production forests in Sweden and its tolerance to forestry. They impugn its usefulness as an indicator of forest continuity. There is a similar situation in the Czech Republic – *C. parvum* grows often in managed monodominant pine forests. However, these investigated habitats are probably natural for *Pinus sylvestris* (former virgin mixture forests – e.g. forest with *Abies alba*, *Picea abies*, *Betula pendula*, *Quercus robur*, and *P. sylvestris* in Třeboňsko basin).

*C. parvum* is accompanied by other acidophilic epiphytic lichens typical for bark of Scots pines in less polluted regions of the Czech Republic: *Bryoria fuscescens*, *Chaenotheca ferruginea*, *Cladonia cenotea*, *C. coniocraea*, *C. digitata*, *C. ochrochlora*, *C. squamosa*, *Hypocenomyce caradocensis*, *H. scalaris*, *Hypogymnia physodes*, *Imshaugia aleurites*, *Lecanora conizaeoides*, *Lepraria* sp. (one investigated specimen belongs to *L. jackii*), *Micarea melaeana*, *M. prasina*, *Parmeliopsis ambigua*, *Platismatia glauca*, *Pseudevernia furfuracea*, and *Usnea hirta*. A very similar epiphytic lichen assemblage was described from bark of Scots pine in N Poland by JANDO (2000). In addition, *Hypogymnia farinacea*, *Lecanora* cf. *symmicta*, *Lecidea nylanderii*, and *Parmeliopsis hyperopta* were observed in higher altitudes (Bohemian Forest, Novohradské Hory Mts.).

During the search for *C. parvum* in the Bohemian Forest I often encountered another small *Calicium* species – *C. pinastrii*. These two taxa are very similar at first sight, but *C. pinastrii* differs in non-verrucose thallus, short-stalked, epruinose ascomata with (often) ob-conical capitulum and cylindrical asci with uniseriately arranged spores (Fig. 2).

Both species seem to be similar in their ecological requirements. All collections of *C. parvum* were made on Scots pine trees (20–40 cm in diameter, ca 50–150 years old) with well-developed bark scales, up to 0.5–2.5 m from the ground (largest cover of the thallus often about 2 m from the ground). *C. pinastrii* was found on a broader range of substrates, mostly on conifers (*Picea abies*, *Pinus sylvestris*, *P. nigra*, *P. rotundata*). Several collections were made on lignum of pine (one from Sweden on bark of *Alnus glutinosa* – JONSSON 2003). *C. pinastrii* was often collected from easily flaking bark of rather thin trees (up to 15 cm in diameter), but I collected it also on trees with diameters up to 40 cm (*Pinus nigra*, *P. sylvestris*). I observed both species only once growing at one locality, in a mature managed stand of *Pinus sylvestris* with intermixed *P. nigra*. *C. parvum* was growing on *P. sylvestris*, while *C. pinastrii* occupied *P. nigra*. I have never met these species growing side by side.

Lichens associated with *C. pinastrii* included *Hypogymnia physodes*, *H. farinacea*, *Imshaugia aleurites*, *Lecidea nylanderii*, *Parmeliopsis ambigua*, *P. hyperopta*, and *Pycnora sorophora* (especially in swamp forests with *Pinus rotundata*). In forests with *Pinus sylvestris* epiphytic lichen species are similar to those associated with *C. parvum* (see above).

*C. pinastrii* grows in similar conditions as *C. parvum*, however, according to JONSSON (2003) and my own observations, it seems to be more tolerant to desiccation of habitats occurring often in more opened sites (border of a forests, well-lit swamp forests, etc.).

Based on recent collections, *C. parvum* and *C. pinastrii* have different altitudinal ranges in the Czech Republic. *C. pinastrii* was found only in montane regions including the zone of climax spruce forest (650–1250 m a.s.l.), *C. parvum* occurs in submontane to montane regions (418–880 m), for distribution in the Czech Republic see Fig. 4.

Besides *C. pinastrii*, corticolous specimens of *C. glaucellum* with developed pycnidia may be mistaken for *C. parvum*. *C. glaucellum* differs (usually) in having a less developed thallus, proportionally longer stalks of apothecia and microscopically by cylindrical, uniseriate

asci (Fig. 3). *C. glaucellum* is usually an epixylic species growing mostly on lignum of both conifers and deciduous trees, but it may rarely grow also on bark of *Picea abies* and *Pinus sylvestris* (TIBELL 1999a). In the Czech Republic the species was recently collected on bark of *Picea abies* and *Pinus rotundata* (see the specimens examined).

### Examined specimens of *Calicium parvum*

Bohemian Forest, Povydrří, small rock with Scots pines near the forest road ca 0.5 km NWW from Buchingrův Dvůr cottage, on bark of *Pinus sylvestris*, alt. 850 m, 21 Jun 2005, O. Peksa (Herb. Peksa No. 148); Bohemian Forest, Povydrří, birch-pine-spruce forest on the E slope under Horní Hrádky, ca 100 m from the river, on bark of *Pinus sylvestris*, alt. 870 m, 49°04.413' N, 13°30.549' E, 31 Oct 2005, O. Peksa et E. Loskotová (Herb. Peksa No. 264); Bohemian Forest, Kašperské Hory, valley of Zlatý Potok stream, S slope of the Liščí Vrch hill, pine forest 100 m above the brook, on bark of *Pinus sylvestris*, alt. 700 m, 49°08.026' N, 13°33.634' E, 22 Jan 2005, O. Peksa (Herb. Peksa No. 150); 4 Sep 2005 (Herb. Peksa No. 147, dupl. UPS); Bohemian Forest, Obří Hrad Mt., relict pine forest on the N slope, under big boulder scree, on bark of *Pinus sylvestris*, alt. 880 m, 49°06.318' N, 13°35.391' E, 5 Sep 2005, O. Peksa et F. Bouda (Herb. Peksa No. 265); Novohradské Hory Mts., Velký Jindřichov, pine forest by the road from Velký Jindřichov (1.5 km NW) to Benešov nad Černou, on bark of *Pinus sylvestris*, alt. 700 m, 48°43.313' N, 14°39.108' E, 28 May 2004, O. Peksa (Herb. Peksa No. 149); Novohradské Hory Mts., Nové Hrady, pine forest by the road 0.5 km S from Městský Mlýn mill, on bark of *Pinus sylvestris*, alt. 530 m, 48°46.523' N, 14°47.288' E, 15 Oct 2005, O. Peksa et Z. Jindráková (Herb. Peksa No. 153); Třeboňsko Basin, Třeboň, Domanín, pine forest 2.5 km S from Domanín, on bark of *Pinus sylvestris*, alt. 465 m, 48°56.94' N, 14°14.10' E, 20 May 2004, O. Peksa, J. Košnar et T. Kučera (Herb. Peksa No. 152; KUČERA et al. 2006); Třeboňsko Basin, Veselí nad Lužnicí, Hamr, Val, 1.8 km SSW from the village, W from gamekeepers lodge Vřšková, on bark of *Pinus sylvestris*, alt. 418 m, 49°07.740' N, 14°45' E, 49°07.740' N, 14°44.880' E, 28 Oct 2003, O. Peksa, J. Košnar et T. Kučera (KUČERA et al. 2006); Třeboňsko Basin, Kardašova Řečice, Karštejnské Polesí forest ground, 800 m SE from Karštejnská Bašta, on bark of *Pinus sylvestris*, alt. 425 m, 49°08.040' N, 14°48.840' E, 28 Oct 2003, O. Peksa, J. Košnar et T. Kučera (KUČERA et al. 2006); Třeboňsko Basin, Chlum u Třeboně, Staňkov, pine forest in the bay of Staňkovský Rybník pond, on bark of *Pinus sylvestris*, alt. 470 m, 48°59.520' N, 14°59.340' E, 20 May 2004, O. Peksa, J. Košnar et T. Kučera (Herb. Peksa No. 151; KUČERA et al. 2006).

### Examined specimens of *Calicium pinastri*

Bohemian Forest, Prášily – Velký Bor, pine forest on the NE slope of Křemelná River valley, on bark of *Pinus sylvestris*, alt. 800 m, 1 Oct 2005, O. Peksa et E. Loskotová (Herb. Peksa No. 240); Bohemian Forest, Rejstejn, pine forest on rock cliff above junction of Losenice River and Zlatý Potok stream, on bark of *Pinus sylvestris*, alt. 650 m, 22 Jun 2005, O. Peksa (Herb. Peksa No. 239); Bohemian Forest, Kašperské Hory, pine forest on the SW slope of the Zámecký Vrch Mt., 50 m from the stream, on bark of *Pinus sylvestris*, alt. 690 m, 31 Mar 2005, O. Peksa (Herb. Peksa No. 241); Bohemian Forest, Kašperské Hory, open pine forest in the valley SW from Zámecký Vrch Mt., near the stream, on bark of *Pinus sylvestris*, alt. 690 m, 31 Mar 2005, O. Peksa (Herb. Peksa No. 242); Bohemian Forest, Kašperské Hory, valley of Zlatý Potok stream, S slope of the Liščí Vrch hill, pine forest 100 m above the brook, on bark of *Pinus nigra*, alt. 700 m, 20 Mar 2005, O. Peksa (Herb. Peksa No. 243); Bohemian Forest, Strašín – Lazny, pine forest on the W slope of the rocky hill SE from village Lazny, on bark of *Pinus sylvestris*, alt. 680 m, 29 Apr 2005, O. Peksa et E. Loskotová (Herb. Peksa No. 238); Bohemian Forest, Volary, glacial cirque of Plešné Lake – slope below the Stifter monument, 48°47' N, 13°51'45" E, on *Picea* near a dropping vertical rock, alt. 1250 m, 19 Jun 1995, Z. Palice (Herb. Palice No. 80, 81); Bohemian Forest, Volary, southern margin of Plešné Lake, 48°46'30" N, 13°51'55" E, on middle-aged *Picea* just on the lake margin, alt. 1090 m, 29 May 1998, Z. Palice (Herb. Palice No. 1486); Bohemian Forest, Volary, taiga-like forest near the Hučina stream, ca 0.6 km ESE from the railway-stop Černý Kříž, 48°51'30" N, 13°52'20" E, on bark of *Pinus sylvestris*, alt. 740 m, 31 Mar 1998, Z. Palice (Herb. Palice No. 82; TIBELL 1999b); Bohemian Forest, Pěkná, the Vltava River valley, boggy forest with prevailing *Pinus rotundata*, 48°51'15" N, 13°55' E, on bark of *Pinus rotundata*, alt. 735 m, 9 Oct 1998, Z. Palice (Herb. Palice No. 4846), Ibid., 15 Oct 1998, J. Kocourková, Z. Palice et A. Vězda (Herb. Palice No. 1949, A. Vězda, Lich. Rar. Exsic. No. 392; VÉZDA 1999); Bohemian Forest, Nová Pec, nature reserve Houska, 48°48'50" N, 13°57' E, a light stand of *Pinus rotundata* with *Picea* and *Betula* intermixed, on dry thinner branches of *Pinus rotundata*, alt. 725–730 m, 8 Aug 1998, Z. Palice (Herb. Palice No. 836, dupl. UPS); Novohradské Hory Mts., Pohoří na Šumavě, Pohořské Rašeliniště peat-bog, on bark of *Pinus sylvestris*, alt. 895 m, 4 Jun 2001, Z. Palice (Herb. Palice No. 6005; PEKSA et al. 2004).



Fig. 4. Distribution of *C. parvum* (black squares) and *C. pinastris* (empty squares) in the Czech Republic.

### Examined specimens of *Calicium glaucellum*

Bohemian Forest, Volary, Plechý Mt. – light boggy spruce forest NW of Rakouská Louka site and NE of Trojmezí site, 48°46'30–40" N, 13°50'30–45" E, on dry bark of old *Picea*, alt. 1280–1320 m, 28 Jun 1998, Z. Palice (Herb. Palice No. 1655); Bohemian Forest, Nová Pec, nature reserve Houska, a light stand of *Pinus rotundata* with *Picea* and *Betula* intermixed, ca 48°48'50" N, 13°57' E, on bark of *Pinus rotundata*, alt. 725–730 m, 3 May 1997, Z. Palice, det. L. Tibell (Herb. Palice); 27 Sep 1998, Z. Palice (Herb. Palice No. 1485).

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