

## *Biscogniauxia granmoi* (Xylariaceae) in Europe

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**Abstract:** *Biscogniauxia granmoi*, growing on *Prunus padus* (incl. var. *pubescens* = *Padus asiatica*) is reported from Europe and Asia, with material from Austria, Latvia, Norway, Poland, and Far Eastern Russia. It is compared with *B. nummularia* s. str., *B. capnodes* and *B. simplicior*. The taxon was included in the recent revision of *Biscogniauxia* by JU & al. (1998, Mycotaxon 66: 50) under the name "*B. pruni* GRANMO, LÆSSØE & SCHEUER" nom. prov.

**Zusammenfassung:** *Biscogniauxia granmoi*, die bisher ausschließlich auf *Prunus padus* (inkl. var. *pubescens* = *Padus asiatica*) gefunden wurde, wird aufgrund von Aufsammlungen aus Europa und Asien vorgestellt. Die bisherigen Belege stammen aus Österreich, Litauen, Norwegen, Polen und dem fernöstlichen Teil Rußlands. Die Unterschiede zu *B. nummularia* s. str., *B. capnodes* und *B. simplicior* werden diskutiert. Dieses Taxon wurde unter dem Namen "*B. pruni* Granmo, Læssøe & Scheuer" nom. prov. schon von JU & al. (1998, Mycotaxon 66: 50) in ihre Revision der Gattung *Biscogniauxia* aufgenommen.

The genus *Biscogniauxia* KUNTZE (*Xylariaceae*) was resurrected and amended by POUZAR (1979, 1986) for a group of *Xylariaceae* with appanate dark stromata that MILLER (1961) treated in *Hypoxylon* BULL., and for a group of species with thick, discoid stromata formerly placed in *Nummularia* TUL. & C. TUL. (non HILL), *Nummulariella* ECKBLAD & GRANMO, or *Numulariola* HOUSE. The type species, *B. nummularia* (BULL.: FR.) KUNTZE, is apparently confined to *Fagus sylvatica* L. and *F. orientalis* LIPSKY in Eurasia. The range of mainly tropical varieties recognized by MILLER (1961, as *Hypoxylon*) was revised in the latest comprehensive treatment of the genus *Biscogniauxia* by JU & al. (1998).

GRANMO in his unpublished M.Sc. thesis (1977) described a taxon in this complex seemingly confined to *Prunus padus* in Northern Eurasia. His view, at that time, was to treat the taxon at varietal level under *B. nummularia* (var. *peripterum*). Recently VASILYEVA (1998) described this taxon at the species level as "*B. granmo*" based on material from Far Eastern Russia. Based on our own morphological studies we support this

proposal. In Europe the Austrian botanist W. MAURER discovered the taxon in southern Steiermark in the course of a mapping project on wood-inhabiting fungi. A number of Austrian records and features of the biology of the taxon were treated by KAHR & al. (1996, as *Hypoxylon nummularium* "cf. var. *peripterum*", with habit photograph) and likewise in VASILYEVA & SCHEUER (1996). VASILYEVA (1988) already reported the species (as *B. nummularia*) from Far Eastern Russia on *Padus asiatica* KOM. (= *Prunus padus* var. *pubescens* REGEL & TILING) and has forwarded her material for study. The Danish Mycological Society's expedition to eastern Poland (KNUDSEN 1985, GRANMO & al. 1989) also yielded two collections. In the revision of the genus by JU & al. (1998) the species is treated as "*Biscogniauxia pruni* GRANMO, LAESSØE & SCHEUER" nom. prov., but the publication by VASILYEVA (1998) has made the validation of *B. pruni* redundant.

### Material and methods

Spores and asci have been measured and drawn in water mounts and the apical apparatus in Melzer's reagent. Collections are deposited in the herbaria indicated, the abbreviations following the Index Herbariorum.

### Taxonomy

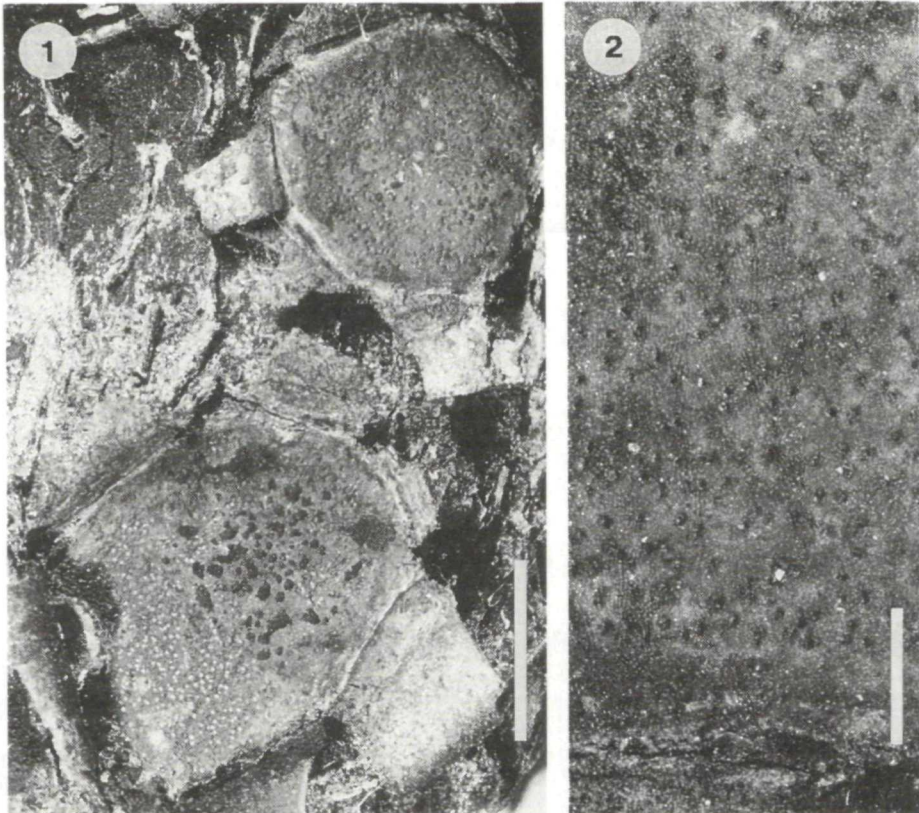
*Biscogniauxia granmoi* LAR. N. VASSILJEVA (= VASILYEVA), *Plantae non vasculares, Fungi et Bryopsidae orientis extremi Rossica* 4: 81, 1998 (as *B. granmo*) (Figs 1-6, 9)

**Description:** Stromata erumpent through the outer bark layer, 4 x 3 mm to 27 x 12 mm, typically ca. 10 x 9 mm, and in section ca. 1 mm thick and to 1.5 mm at margin, outline often circular but also more irregular and individual stromata sometimes confluent, ectostroma bipartite with outer part sloughing off at maturity, with thin bark flanges around the slightly raised, abrupt margin, surface even, almost black with a more or less distinct grey brown sheen especially in young condition, with no KOH/ Acetone soluble pigments (on blotting paper); ostioles inconspicuous to conspicuous, mostly clearly pitted and wide at maturity. Perithecia (0.6-)0.8 x 0.3-0.5(-0.7) mm, narrowly ovoid to cylindrical; carbonaceous layer above perithecia 0.1-0.2 mm thick; stromatal tissue in between perithecia rather sparse, dense and carbonized, no basal stroma but a zoneline bound, pale wood brown or greyish pseudostroma is present, to 1.5(-3) mm thick, and formed by extension of the outer crust into the bark. A layer surrounding the perithecia is darker brown than the stroma further out and consists of cells with a small diameter and thick walls. At the base of the perithecia, cells 5-8 µm diam., are arranged in a 60-80 µm thick *textura angularis* and further up it approaches *textura oblita*, with cells ca. 20 x 3.5 µm, with walls slightly thinner than further down. The tissue between perithecia, where space permits, is paler brown with larger diameter cells, *textura angularis* approaching *textura prismatica*, with cells up to 18 x 7 µm. In all tissues scattered black, carbonized particles, 10-30 µm diam., are present. Asci 8-spored, cylindrical, short stipitate, 119-142 x 7-8.5 µm, stipe 10-34 µm long, ascus annulus discoid, 3.5-4.5 x 1.7 µm, dark blue in Melzer's reagent. Paraphyses filiform, 3-4 µm wide, to 270 µm long, mostly unbranched, rarely forked near the tips, thin-walled, remotely septate, attenuating towards apex, with some yellowish contents. Ascospores (10-)11-13.5(-15) x (4.5-)5-6.5(-7) µm (interval of means: 11.6-12.7 x 5.3-6.1 µm; 90/6), mean length/breadth ratio (Q) 2-2.3,

slightly inequilateral-ellipsoid with broadly rounded ends, often more rounded at one end, somewhat translucent brown (bronze/sooty brown, ca. 5EF5; KORNERUP & WANSCHER 1974), uniseriate within ascus, 0-1-2 guttulate. Germ slit full spore-length, conspicuous, typically on the more convex side, no gelatinous equipment or primary appendage present. Spore deposit on paper is dull black.

**Other illustrations:** KAHR & al. (1996: 93, Abb. 6, habit photograph on tree trunk, as *Hypoxyton nummularium* "cf. var. *peripterum*"), GRANMO & al. (1989: 63, fig. 5, habit photograph of stromata, as *B. nummularia*), JU & al. (1998: 94, 97, figs. 55 and 64, drawings of ascus annulus, ascospores, anamorph), VASILYEVA (1998: fig. 20, habit photograph on *Padus asiatica*).

**Culture and anamorph:** Very similar to a culture of *B. nummularia* (TL-4071) that was run in parallel. On PDA the colonies had a striking yellow pigmentation barely present on malt, and colonies much looser and slower growing on malt as compared to PDA, where they reached the margin within a week at room temperature with alternating light and dark. The colonies sporulated vigorously on PDA and could be assigned to *Nodulisporium* PREUSS s. l.



Figs. 1-2. *Biscogniauxia granmoi* (SCHEUER 3139). - Bar: 1 = 5 mm, 2 = 1 mm.

**Distribution:** Austria, Latvia, Norway, Poland (Fig. 9), and Far Eastern Russia.

**Material examined:** All collections are on trunks and thick branches of *Prunus padus*, except the Russian material, which is on the Northeast Asiatic *Padus asiatica* (= *Prunus padus* var. *pubescens*).

**Austria:** Niederösterreich, Korneuburg Dist., Rußbach, 500 m S of Dauersberg, grid 7562/1, c. 300 m s. m., mixed deciduous forest with *Fraxinus*, *Carpinus* and *Quercus*, 1. 5. 1996, A. HAUSKNECHT (SCHEUER 3187) (GZU); - Stockerau, along the Danube near Oberzöggersdorf, "Jägerhausboden", grid 7662/2, c. 170 m s. m., mixed deciduous forest along river, 1. 5. 1996, A. HAUSKNECHT (SCHEUER 3186) (GZU). Steiermark, Bad Radkersburg, near the river Mur, S of Laafeld, 205 m s. m., grid 9362/1 (46°40'N/16°00'E) on bark of dead trees of *Prunus padus*, softwood forest with *Populus nigra*, 29. 1. 1995, W. MAURER (SCHEUER 3140) (GZU); - - 22. 2. 1995, W. MAURER & Ch. SCHEUER (SCHEUER 3139) (C, BPI, GENT, GZU, K, S, TROM, WSP); - - 21. 2. 1996, D. PRELICZ (SCHEUER 3182) [C, GZU, + recipients of *Mycotheca Graecensis* and *Microfungi exsiccati*, culture AAS 274 (Culture collection, Dep. of Mycology, Botanical Institute, Copenhagen University) & CBS]; - - 20. 3. 1996, D. PRELICZ s. n. (SCHEUER 3183) (GZU, TROM); - c. 8 km WNW of Bad Radkersburg, near the river Mur, opposite to the small village Mihovci (Slovenia) between a small stream and the banks of Mur, grid 9261/3, ca. 220 m s. m., mixed deciduous forest, 20. 3. 1996, D. PRELICZ s. n. (SCHEUER 3188) (GZU, TROM). Osttirol, ?Lavant (6 km E of Lienz, 46°47'N/12°50'E; 783 m s. m.), Nov. 1982, A. KOFLER (SCHEUER 3185) (GZU, LI). Salzburg, SE border of Salzburg-city, Aigen-Au near Glasenbach (47°46'N/13°04'E), ca. 430 m s. m., 25. 4. 1992, H. FORSTINGER (soc. *Phellinus conchatus*) (SCHEUER 3184) (GZU, LI-115320).

**Latvia:** Prov. Vidzeme, Lielvārde, 28. 5. 1933, A. KIRULIS 446, as *Nummularia bulliardi* (K, BPI). - Dist. Riga, Sigulda im Walde, 12. 9. 1935, J. SMARODS Fungi Latvici Exs. XIII. 633 (RIG, PRM 718904); - - 7. 9. 1936, J. SMARODS Fungi Latvici, as *N. bulliardi* (K, PRM 718922); - - 8. 9. 1938, J. SMARODS Fungi Latvici (UPS); - Krimulda, ad rip. flum. Gauja, 8. 11. 1937, J. SMARODS (LE 127001); - Turaida, 12. 9. & 15. 11. 1935, J. SMARODS Fungi Latvici as *N. bulliardi* (PRM 718912 & 718908).

**Norway:** Oslo ('Kr.ania') s. d., herb. MOE (O); Oslo, Skøyen, 10. 18-? (O); Oppland, Ringebu, 10. 1832, S. C. SOMMERFELT (O, 2 coll.).

**Poland:** Pow. Hajnówka, Białowieża, mixed ancient woodland, 8. 10. & 11. 10. 1984, P. D. RABENBORG & S. KLUG-ANDERSEN s. n. (C).

**Russia:** Russian Far East, Primorski Krai, Anisimovka, 14. 10. 1994, L. N. VASILYEVA s. n. (old material) (C, VLA); - - 15. 10. 1994, L. N. VASILYEVA (good material) (C, VLA).

### *Biscogniauxia nummularia* (BULL.: FR.) KUNTZE (Figs. 7-8)

A detailed description can be found in HILBER & HILBER (1980) and for an important discussion on characters the reader is referred to POUZAR (1979). Further notes and a photograph were published by ENDERLE (1982). The *Nodulisporium*-like anamorph was described in GREENHALGH & CHESTERS (1968), PETRINI & PETRINI (1985) and PETRINI & MÜLLER (1986). This is the type species of the genus *Biscogniauxia*.

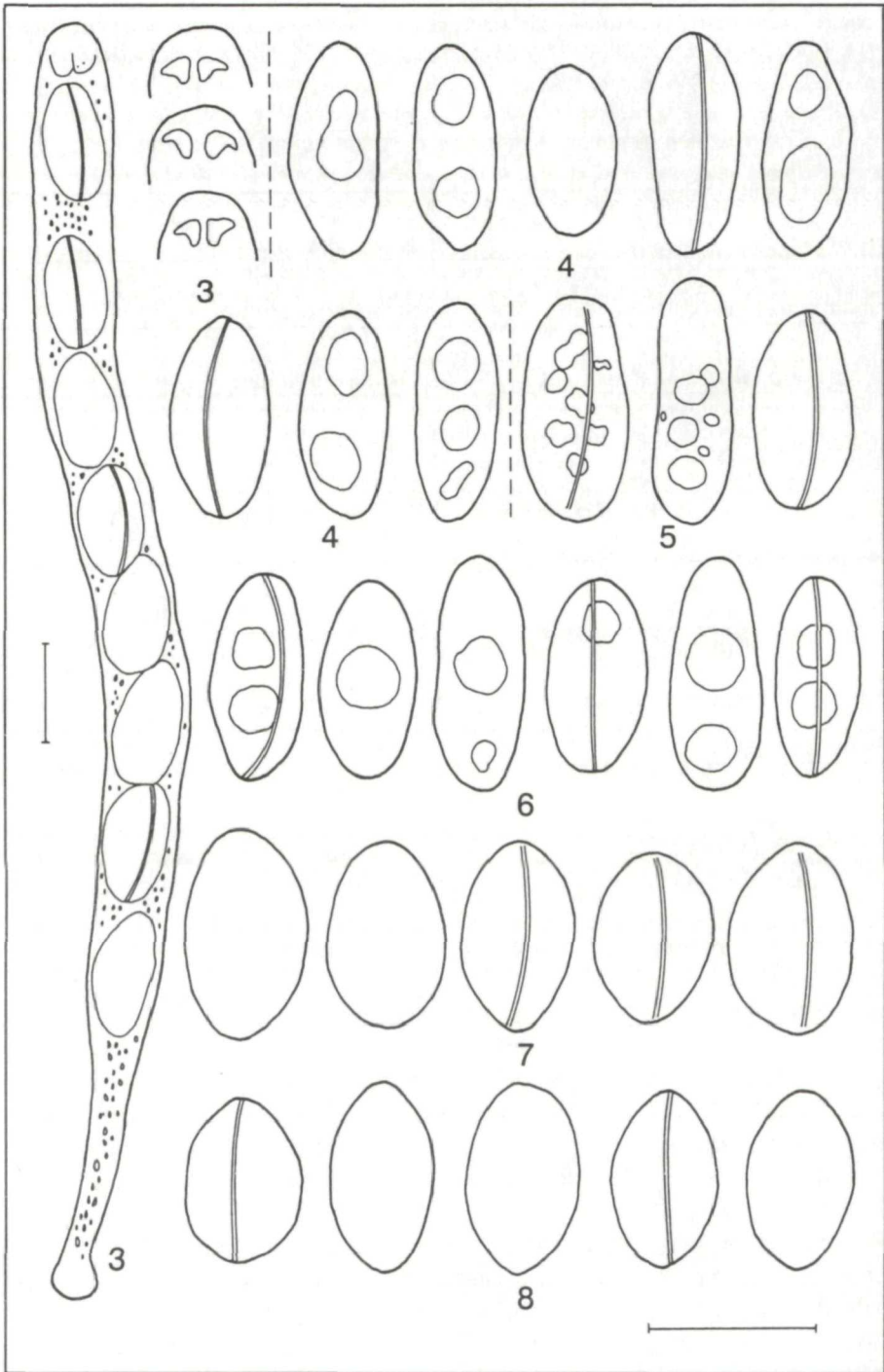
**Material examined:** On corticated *Fagus sylvatica* trunks or branches unless otherwise indicated.

**Austria:** Niederösterreich, Lainzer Tiergarten bei Wien, 20. 7. 1930, H. LOHWAG s. n., V. LITSCHAUER & H. LOHWAG Fungi selecti exsiccati europaei 99. *Nummularia bulliardi* (L).

**Czech Republic:** Moravia, Adamsthal prope Brünn, NIESSL s. n., KEISSLER, Kryptogamae Exsiccatae Vindob. 516. *Nummularia nummularium* (C).

**Germany:** Oberbayern, Wessling, s. d., REHM, REHM Ascomycetes 1769b. *Nummularia anthracina* (KZE. & SCHM.) TRAV. f. *juvenilis* (LE 127007).

**United Kingdom:** England, Buckinghamshire, Ellesborough Warren, 4. 10. 1975, A. J. S. WHALLEY 339 (C 19269); - Herefordshire, Whitchurch-on-Wye, Great Doward, Leeping Stocks, 1. 4. 1996, T. LÆSSØE 4071 (C 34520).



Figs. 3-7. *Biscogniauxia granmoi*. 3. Ascus and apical apparatus stained in Melzer's reagent (SCHEUER 3139). 4. Ascospores (SCHEUER 3139). 5. Ascospores (SCHEUER 3182). 6. Ascospores (15. 10. 1994, VASILYEVA). Figs. 7-8. *Biscogniauxia nummularia*. 7. (KESSLER, *Kryptogamae Exsiccatae Vindob.* 516). 8. (*Mycotheca Rossica* 277). - Bars: 10  $\mu$ m.

**Russia:** Krasnodar Terr., Prov. Kuban, Caucasia bor., Klutschewaja, in ramis *Fagi orientalis* LIPSKY, 6. 1911, TRANZSCHEL & SEREBRIANIKOW, Mycotheca Rossica, 277. *Nummularia bulliardi* TUL. var. nov. *minor* REHM (LE 126997; K two parts).

Table 1. A comparison between *Biscogniauxia granmoi* and *B. nummularia*.

<i>B. granmoi</i>	<i>B. nummularia</i>
Stroma margin raised	Stroma margin not raised
Ostioles not papillate	Ostioles papillate
Perithecia narrowly ovoid to cylindrical	Perithecia broadly ovoid
Stroma in between perithecia rather sparse	Stroma in between perithecia thicker, more woody
Spores medium brown	Spores opaque dark brown
Spore Q: 2 - 2.3	Spore Q: 1.5 - 1.6
On <i>Prunus</i> (incl. <i>Padus</i> )	On <i>Fagus</i>

### Discussion

*Biscogniauxia granmoi* belongs in *Biscogniauxia* sect. *Biscogniauxia* (POUZAR 1986) and is clearly related to *B. nummularia*. VASILYEVA (1998) utilizes a completely different classification in which *Biscogniauxia* is treated as belonging to *Diatrypeae* in the *Diatrypaceae*. Furthermore, VASILYEVA (1998) treats both *Camarops* KARST. and *Diatrypeopsis* SPEG. as synonyms of *Biscogniauxia*. We strongly disagree with this synonymy on taxonomical grounds, but the disposition is also on nomenclatural grounds impossible, since both names are older than *Biscogniauxia*. JU & al. (1998) discussed the possible relationship of *Biscogniauxia* with the *Diatrypaceae*, but after having excluded various elements from *Biscogniauxia* concluded that this genus belongs in the *Xylariaceae*. *Camarops* was accepted at genus level and placed in the *Boliniaceae* that was transferred from familiae insertae sedis to the *Sordariales* based on 18S rDNA sequence data (ANDERSSON & al. 1995).

The features leading us to treat *B. granmoi* at species rank are tabulated in Table 1. The most obvious morphological characters are the spore dimensions and spore colour. A detailed anatomical study of *B. nummularia* was carried out by HILBER & HILBER (1980). Differences in stromatal shape in the two species could at least in theory be induced by the different hosts, but judged by the situation in other *Biscogniauxia* species with a wider host range, this seems unlikely. The separating characters remain constant over a very wide geographical area, although collections bridging Far Eastern Russia with the Baltic area are lacking. Using POUZAR's (1986) key to European *Biscogniauxia* species, *B. granmoi* keys out in *B. nummularia*. MILLER (1961) evidently did not con-

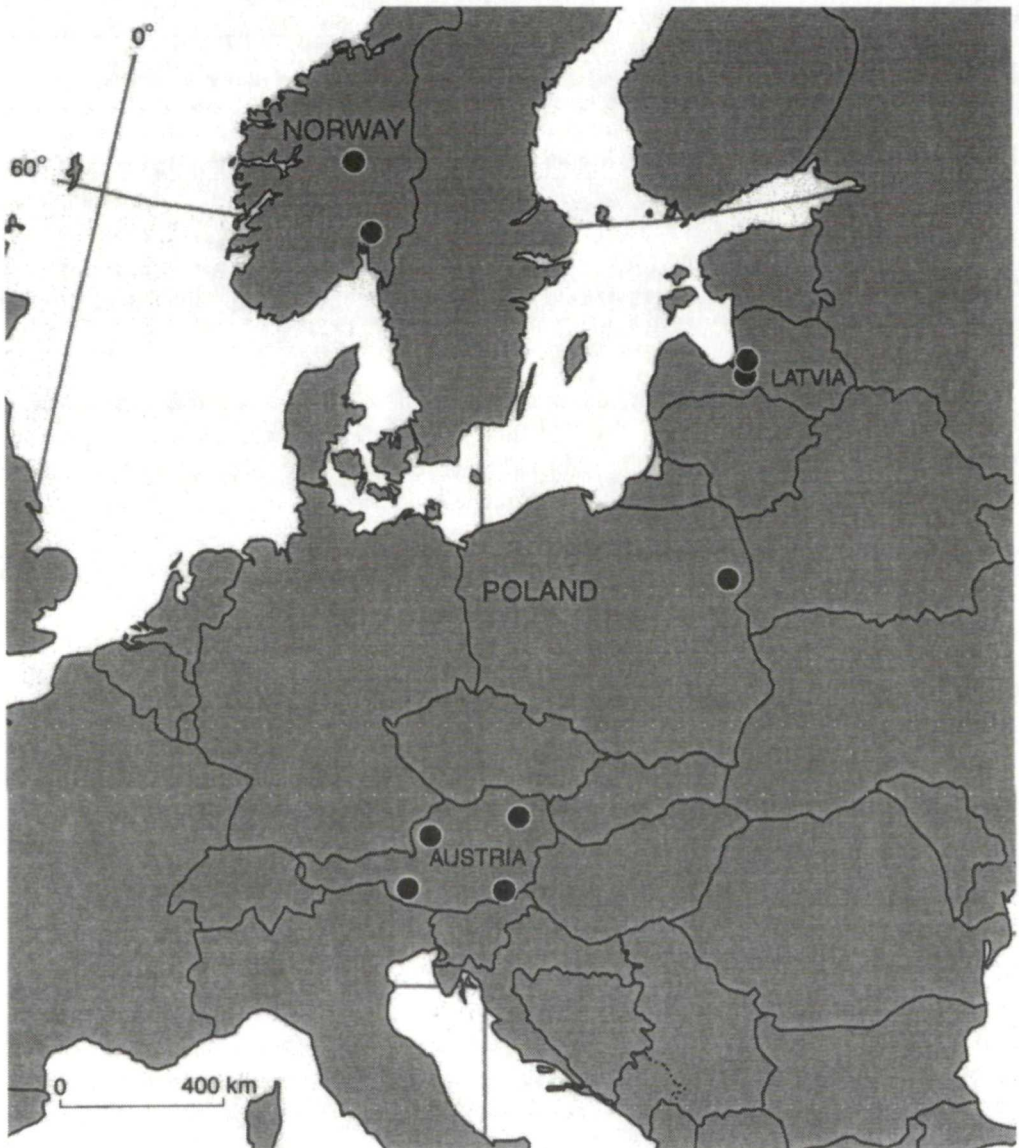


Fig. 9. Map showing European sites of *Biscogniauxia granmoi*.

sider material from *Prunus* worthy of any taxonomic rank, since he cited 'KIRULIS 446 (BPI)' from *Prunus padus* under *B. nummularia* (as *Hypoxyton*). This is surprising since MILLER (1961) treated a range of tropical material with slight differences in spore measurements at the varietal level. These varieties have been revised (JU & al. 1998) and have been sunk under *B. capnodes* (BERK.) Y.-M. JU & J. D. ROGERS [= *Hypoxyton*

*capnodes* (BERK. & BROOME) COOKE] or treated as varieties thereof. *Biscogniauxia capnodes* differs from *B. nummularia* s. str. in having strongly carbonized stroma in between the perithecia and in having less rounded ascospores (higher Q values), and from *B. granmoi* in being less discoid, in having papillate ostioles, and an entirely carbonized entostroma.

In habit, young or small stromata of *B. granmoi* may also show some similarity to those of *B. simplicior* POUZAR, a species originally described from Bohemia (Czech Republic) growing on *Rhamnus catharticus* L. (POUZAR 1979). However, well-developed stromata of *B. simplicior* are much thicker (2.5–6 mm) and cupulate, with a narrow base and a raised margin of thick, rough teeth strongly resembling *B. repanda* rather than *B. granmoi*. Diagnostic characters of *B. simplicior* on the microscopic level are, e.g., the strongly carbonized ostioles and the longer ascospores (13–17.5 x 5–6.5 µm).

One of the Norwegian collections cited were reported as *Nummularia bulliardi* (= *B. nummularia*) on *Prunus padus* by ROSTRUP (1904). The others had either *Sphaeria nummularia* or *Nummularia repanda* [= *B. repanda* (FR.: FR.) KUNTZE] as herbarium determinations. There are very few Scandinavian reports of *B. nummularia* on any host, despite *Fagus sylvatica* is a dominant tree in the southern parts and *Prunus padus* is common in the whole area. The only previous Danish record of *B. nummularia* (LIND 1913) proved to represent *Hypoxylon cohaerens* (PERS.: FR.) FR., but LÆSSØE (1998) found the species at one site in Southern Jutland. Likewise in Sweden no records since FRIES (1849; record not unambiguously supported by specimen) have appeared but again one recent find in the southernmost part has been made (HANSSON 1996). It is not unlikely that *B. pruni* likewise has been overlooked, despite its prominent stromata. The distribution so far obviously points to a species belonging to an eastern, continental element in Europe, not very different from the distribution patterns of *B. repanda* and *B. cinereolilacina* (J. H. MILL.) POUZAR (GRANMO & al. 1989). There is a strong host preference in many *Biscogniauxia* species (POUZAR 1986; WHALLEY & al. 1990). Possible other hosts for *B. granmoi* should above all be searched for in *Prunus/Prunoideae*.

The anamorph of *B. granmoi* was found to be very similar to that of *B. nummularia*. This is not surprising since PETRINI & MÜLLER (1986) found that an anamorph morphologically very similar to *B. nummularia* isolated from tropical orchids gave rise to a teleomorph (on *Quercus*) with ascospores similar to those of *B. nummularia* var. *merrillii* (BRES.) J. H. MILLER (= *B. capnodes*). JU (1990) was unable to distinguish anamorphs of *B. nummularia* var. *nummularia* and *B. nummularia* var. *merrillii*. Cultural and anamorphic characters of the genus have been described and discussed in MARTIN (1969, as *Numulariola*), JONG & ROGERS (1972, as *Hypoxylon*), CALLAN & ROGERS (1986), VAN DER GUCHT (1996) and JU & al. (1998).

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