

Distribution and potential threat of *Biscogniauxia cinereolilacina* on *Tilia tomentosa* in Bulgaria

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Abstract

In Bulgaria, the fungus *Biscogniauxia cinereolilacina* (J.H. Mill.) Pouzar has been firstly reported based on herbarium material. In recent years, the pathogen has been recorded in urban green areas in Northeastern Bulgaria. The present study provides data on three newly identified localities of *B. cinereolilacina* on *Tilia tomentosa* Moench in various regions of the country. The aim of this study was to identify the causal agent of the observed dieback of *T. tomentosa* through morphological examination of stromata, perithecia, and ascospores, and to characterise the obtained isolates in culture. Our results indicate that, since its initial record in 1983, the species has significantly expanded its distribution, likely as a result of extreme temperature and precipitation fluctuations observed in recent years. Although *B. cinereolilacina* does not currently pose a serious threat to linden trees, continuous monitoring of their health is necessary to allow timely implementation of appropriate conservation measures.

Key words: fungal endophyte, linden, mycelial growth, pathogens, wood-decaying fungi, Xylariales.

Introduction

The natural range of the silver linden, *Tilia tomentosa* Moench, covers Southeastern Europe and Asia Minor (Bartha et al. 1995, Radoglou et al. 2009, Dimopoulos et al. 2013, Šapić et al. 2025). In Bulgaria, the species is more widely distributed than *Tilia cordata* Mill. and *Tilia platyphyllos* Scop., except in Western Bulgaria. It occurs as a component of mixed deciduous forests, but also forms pure stands

within an altitudinal range of 50–1000 m a.s.l. In many areas of Northeastern Bulgaria, silver linden displaces other tree species and assumes a dominant position in mixed deciduous forests (Yurukov 2003). In some localities, its occurrence has secondarily expanded, mainly as a result of selective logging of oaks with which it forms mixed communities (Ganeva et al. 2009). Natural forests dominated by silver linden represent an endemic habitat type for Bulgaria, Romania, and Serbia, and

occupy relatively limited areas in Bulgaria, which increases Bulgaria's responsibility for their conservation at the European Union level. These forests are included in the section 'Natural Habitats' of the Red Book of the Republic of Bulgaria (2011) and are classified as EN – Endangered.

Tilia tomentosa is also frequently found outside its natural range, being widely planted in parks, gardens, and along urban streets due to its high drought tolerance, resistance to air pollution and pests, and its ornamental crown (Yücedağ et al. 2019).

Serious phytosanitary problems affecting linden trees are rarely reported. Potential insect pests include the Japanese beetle *Popillia japonica* (Newman, 1838) spider mites, and aphids (Thurn et al. 2019). Fungal diseases mainly affect the leaves, such as anthracnose and powdery mildew, and canker diseases (e.g. *Nectria* spp.) are also observed. Studies conducted in the green areas of Vilnius, Lithuania, documented infections by the following fungal pathogens: *Apiognomonia errabunda* (Roberge ex Desm.) Höhn., *Diaporthe eres* Nitschke, *Flammulina velutipes* (Curtis) Singer, *Leptoxylum fumago* (Woron.) R.C. Srivast, *Mycosphaerella millegrana* (Cooke) J. Schröt., *Nectria cinnabarina* (Tode) Fr., *Pholiota aurivella* (Batsch) P. Kumm., *Polyporus septosporus* P. K. Buchanan & Ryvarden, *Schizophyllum commune* Fr., and *Thyrostroma compactum* (Sacc.) Höhn. (Stravinskienė et al. 2015). Based on herbarium specimens deposited at the Universities of Helsinki and Turku, *A. errabunda* has been concluded to be native and widespread on *T. cordata* in Finland, occasionally infecting other deciduous tree species including *Quercus robur* L., *Tilia* spp., and *Fagus* spp. (Vainio et al. 2017). In 2021, viral mosaic disease on *Tilia* leaves was reported

for the first time in Istanbul, Turkey (Çitir et al. 2021).

Investigations of ornamental and forest trees in the Czech Republic revealed symptoms associated with *Phytophthora* spp. infections in more than 160 isolates from 20 host species, including *T. cordata*, with two species identified: *Phytophthora multivora* P.M. Scott & T. Jung and *Phytophthora plurivora* T. Jung & T.I. Burgess (Mrázková et al. 2013). In 2023, five bacterial species, including *Gibbsiella quercinecans* Brady et al. 2011, were detected on *T. cordata* in an urban environment. This bacterium was found in the larval galleries of the polyphagous beetle *Agrilus viridis* (Linnaeus, 1758), which presumably vectored it from oak hosts (Tkaczyk et al. 2024).

Biscogniauxia cinereolilacina (J.H. Mill.) Pouzar is an ascomycete fungus of the order Xylariales, family Graphostromataceae, occurring as a saprophyte on the wood of *Tilia* species. The fungus inhabits damaged or dead parts of standing stems, as well as dead, fallen wood (Bratteby 2017). The species is closely associated with *Tilia* and has been documented in several European countries.

Most records originate from Central and Northern Europe: in the Czech Republic on *T. platyphyllos* and *T. cordata* (Pouzar 1986, Zíbarová and Kout 2017); in Slovakia on *T. cordata* (MyCoPortal 2025); in Sweden on *T. cordata* and *Tilia × europaea* (Eriksson 2014, Hallqvist and Aronsson 2016, Bratteby 2017, MyCoPortal 2025); in Norway on *Tilia* spp., including *T. cordata* (Granmo and Petrini 1996, MyCoPortal 2025); in France on *Tilia* sp. (Ju et al. 1998); in Germany on *Tilia* spp. (MyCoPortal 2025); in Ukraine on *T. cordata* (Klimova and Akulov 2005); and in Hungary on *T. cordata* (Ju et al. 1998, MyCoPortal 2025). The species

has also been reported from the United States, where it was originally described as *Hypoxylon cinereo-lilacinum* (Berk. & Broome, 1873) and later reclassified as *B. cinereolilacina* (Pouzar 1979, Grootmyers 2021, MyCoPortal 2025), including records on *Tilia americana* L. (Ju et al. 1998, MyCoPortal 2025), as well as from Canada (Kuthan and Kotlaba 1988, Ju et al. 1998, MyCoPortal 2025).

In Bulgaria, *B. cinereolilacina* was recorded in the Kozluka Valley near Saint Vlas, at approximately 160 m a.s.l., on a dead branch of *T. tomentosa* on 25 August 1983. The specimen was collected by Czech mycologist F. Kotlaba, identified by his colleague Z. Pouzar, and deposited in the National Museum in the Czech Republic, under accession number PRM 831856 (Pouzar 1986, Kuthan and Kotlaba 1988). In recent years, symptoms of disease caused by *B. cinereolilacina* have been observed on dead and dying *T. platyphyllos* and *T. tomentosa* trees in the city park 'St. George' in Dobrich, North-eastern Bulgaria (Ivanov et al. 2026).

The aim of this study is to identify the causal agent of the observed dieback of *T. tomentosa* in Bulgaria through morphological examination of stromata, perithecia, and ascospores, and to characterise the obtained isolates in culture.

Materials and Methods

During the implementation of the project 'Distribution of wood-decaying fungi of the order Xylariales (Ascomycota) in oak stands in Bulgaria', symptoms of dieback were observed on *T. tomentosa* in three regions of Bulgaria. Observations were made on 9 July 2024 at the State Hunting Enterprise (SHE) Bolyarka near the Preobrazhenski Monastery, on 9 June 2025

in the State Forestry Enterprise (SFE) Vidin (Bozhuritsa locality), and on 6 August 2025 at the SFE Karnobat, near the village of San Stefano (Fig. 1).

In the vicinity of the Preobrazhenski Monastery, symptoms of dieback were observed on an approximately 70 years old tree growing at 250 m a.s.l. in forested terrain managed by SHE Bolyarka and owned by a religious organisation (N 43°06'56"; E 25°36'24"). The stand is high forest of natural coppice origin, composed of a single tree layer. Samples of bark bearing stromata were collected from two trees and from several fallen branches in the immediate vicinity, resulting in a total of six samples for analysis.

Near the village of San Stefano, at 270 m a.s.l., symptomatic trees approximately 40 years old were recorded in forested land managed by SFE Karnobat (N 42°30'31"; E 26°53'57"). Three samples of bark bearing stromata were collected from a single tree and from several fallen branches. In both of these stands, additional trees and fallen branches bearing Xylariales and other fungal taxa were also observed.

In the Bozhuritsa locality, within the SFE Vidin, trees showing disease symptoms were recorded on a private property at 110 m a.s.l. (N 43°53'53"; E 22°44'36"). Samples consisting of bark with black stromata were collected from two trees and from several fallen branches, resulting in a total of three samples.

All collected samples were analysed in the Forest Phytopathology Laboratory at the University of Forestry, Sofia. Laboratory analyses were conducted using standard methods, including incubation in moist chambers, isolation of the fungus on a universal culture medium (potato dextrose agar – PDA), description of morphological characteristics, and monitoring of myceli-



Fig. 1. Map of Bulgaria showing the locations of the sampling sites in the present study (black circles) and previously reported records of *B. cinereolilacina* (dotted circles).

al growth rate. Mycelial cultures on PDA were obtained from ascospores extracted from the perithecia of mature, dark stromata on the collected samples for monitoring mycelial growth and documenting morphological characteristics, following two successive subculturing steps to ensure culture purification. Growth was carried out and monitored at 25 °C in a Nahita Drying Oven 631 Plus incubator, with measurements recorded daily at the same time. Colony colouration was described using the colour scale of Rayner (1970). Spores of the causal fungus (ascospores from stromata and conidia formed on the mycelium) were photographed using a Kern & Sohn GmbH ODC 825 camera mounted on a BOECO BM-180/SP microscope. Spore dimensions were measured in water mounts using VIS 2.0 Pro soft-

ware (Kern & Sohn GmbH).

Results

In three linden stands, stromata characteristic of representatives of the genus *Biscogniauxia* were recorded on individual trees and fallen branches (Fig. 2). The colouration of the stromata varied depending on their developmental stage. In the area of the Preobrazhenski Monastery, stromata ranging from light gray and lilac to dark brown were observed. In the San Stefano locality, they were small, numerous, and frequently coalescing; their colour ranged from light gray and purplish to light brown, dark brown, and black. No pale stromata were observed at this site. The ones from the Bozhuritsa locality

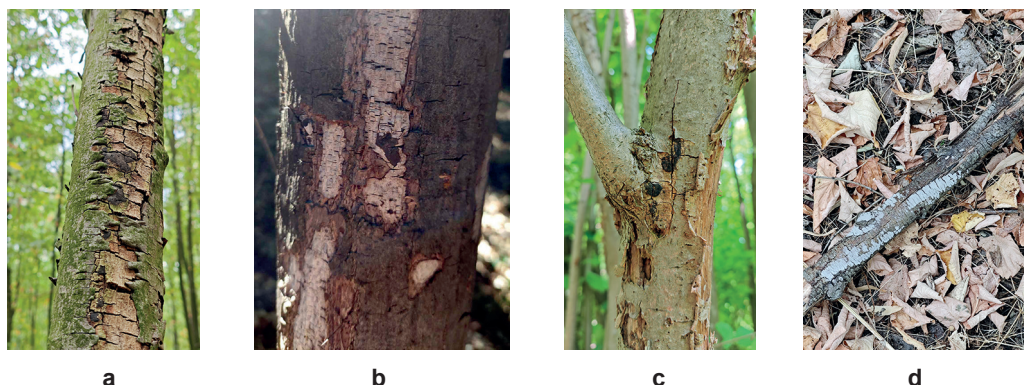


Fig. 2. Stromata of *B. cinereolilacina* on stems and branches of *T. tomentosa*: (a) stromata on a standing tree in the San Stefano locality; (b) coalescing stromata on a standing dead tree near the Preobrazhenski Monastery; (c) numerous small stromata on a standing tree in the Bozhuritsa locality; (d) close-up of the stromatal surface showing colour variation on a dead branch in the San Stefano locality.

were also small and abundant, with some beginning to coalesce; their colouration varied from reddish-brown and brown to black in certain areas.

The thickness of the stromata from the Preobrazhenski Monastery locality ranged from 0.5 to 0.7 mm and in some places corresponded to the height of the perithecia, most often exceeding it by up to 0.1 mm. These measurements are consistent with the stromatal thickness of 0.6–0.7 mm reported for *B. cinereolilacina* (Ju et al. 1998). The same authors described the stromatal surface as dull purplish-brown to dark brown and gray, becoming grayish-black at a later stage, with an outer, thin, disintegrating dark-brown layer. At the periphery, their thickness was approximately 0.4 mm. The interior of the stromata was black and glossy, whereas the surface was matte dark brown, bearing numerous black ostioles that contrasted sharply with the stromatal surface.

The stromata from the San Stefano locality were 0.4–0.6 mm thick and visibly thicker than the height of the perithecia. In them, the surface appeared evenly developed above all perithecia, and the

ostioles were not clearly distinguishable. The thickness of the stromata from the Bozhuritsa locality could not be measured accurately due to their small size and irregular shape.

Perithecia from the Preobrazhenski Monastery locality were obovoid, with a diameter of 0.2–0.4 mm and a height of 0.4–0.6 mm, exhibited a shiny black, tar-like surface. Perithecia from the San Stefano locality were predominantly black, glossy, and obovoid; however, some appeared nearly spherical, oval, or ellipsoid. Their diameter ranged from 0.2 to 0.4 mm and their height from 0.3 to 0.5 mm. Perithecia from the Bozhuritsa locality were ovoid, measuring 0.3–0.4 mm in diameter and 0.4–0.5 mm in height, consistent with the descriptions provided by Pouzar (1979) and Ju et al. (1998), who characterised the perithecia of *B. cinereolilacina* as obovoid, 0.2–0.4 mm in diameter and 0.4–0.5 mm high, with ostioles projecting above the stromatal surface and bearing papillate openings. In the smallest stromata, between 4 and 6, and up to 10 perithecia were observed.

Attempts to isolate mycelial cultures

from stromata collected at the Bozhuritsa locality were unsuccessful; therefore, conidia from this site were not measured or described.

The mycelium of the isolates obtained from material collected near the Preobrazhenski Monastery covered the Petri

dish completely within eight days, with the most intensive growth observed on days 5, 6, and 7 (Table 1, Fig. 3). The mean growth rate was $5.43 \text{ mm} \cdot \text{day}^{-1}$ (range: $4.91\text{--}6.42 \text{ mm} \cdot \text{day}^{-1}$). According to the Rayner (1970) colour chart, the developed colonies exhibited a small olive to

Table 1. Mycelial growth in fungal isolates, mm per day.

Sample No	1 day	2 day	3 day	4 day	5 day	6 day	7 day	8 day	Average growth rate
Preobrazhenski Monastery									
1	0	0	0	2.25	9	13.25	9.5	5.75	4.97
2	0	0	0.25	7	11.5	19.75	-	-	6.42
3	0	0	0.25	4	5.5	16	8.25	5.25	4.91
Average	0	0	0.17	4.42	8.67	16.33	8.88	5.5	5.43
San Stefano									
4	0	0	1.25	7.25	11.75	12.5	7.33	-	5.73
5	0	0	2.25	14.5	14.25	7.75	-	-	6.46
6	0	0	2.5	14.25	19.75	3.5	-	-	6.67
Average	0	0	2	12	15.25	7.92	7.33	-	6.29

nearly black central zone (48), from which a lemon-yellow colouration (13) radiated. The majority of the mycelium was pale vinaceous with a pinkish tint (85). The aerial mycelium was white, sparse, and filamentous.

In the isolates from the San Stefano locality, the mycelium completely covered the Petri dish within seven days, with the most active growth occurring on days 4, 5, and 6. The mean growth rate was $6.29 \text{ mm} \cdot \text{day}^{-1}$ (range: $5.73\text{--}6.67 \text{ mm} \cdot \text{day}^{-1}$). The colonies similarly displayed a small olive-coloured central zone (48), while most of the mycelium was pale vinaceous with a pinkish tint (85). The aerial mycelium was white, sparse, and filamentous, with a denser hyphal centre.

The mycelial growth rates of isolates obtained from linden trees near San Stefano and the Preobrazhenski Monastery were similar. Nutrient utilisation and radial growth toward the periphery of the Petri

dish were most pronounced on days 4, 5, and 6. The minor difference between the mean daily growth rate for the isolates from Preobrazhenski Monastery and for those from San Stefano supports the morphological grouping of the colonies as belonging to the same species.

The dimensions of ascospores isolated from stromata collected near the Preobrazhenski Monastery (Fig. 4), as well as those from the San Stefano and Bozhuritsa locality (summarised in Table 2) are consistent with those reported by Ju et al. (1998) for *B. cinereolilacina*. Ascospores measured from all three localities exhibited high similarity in both length and width. Mean ascospore lengths were $13.35 \mu\text{m}$ (Preobrazhenski Monastery), $13.15 \mu\text{m}$ (San Stefano), and $13.5 \mu\text{m}$ (Bozhuritsa), while mean widths were $6.03 \mu\text{m}$, $6.25 \mu\text{m}$, and $6.15 \mu\text{m}$, respectively. All measurements fall within the size ranges reported by Ju et al. (1998): $12\text{--}16(-17.5)$

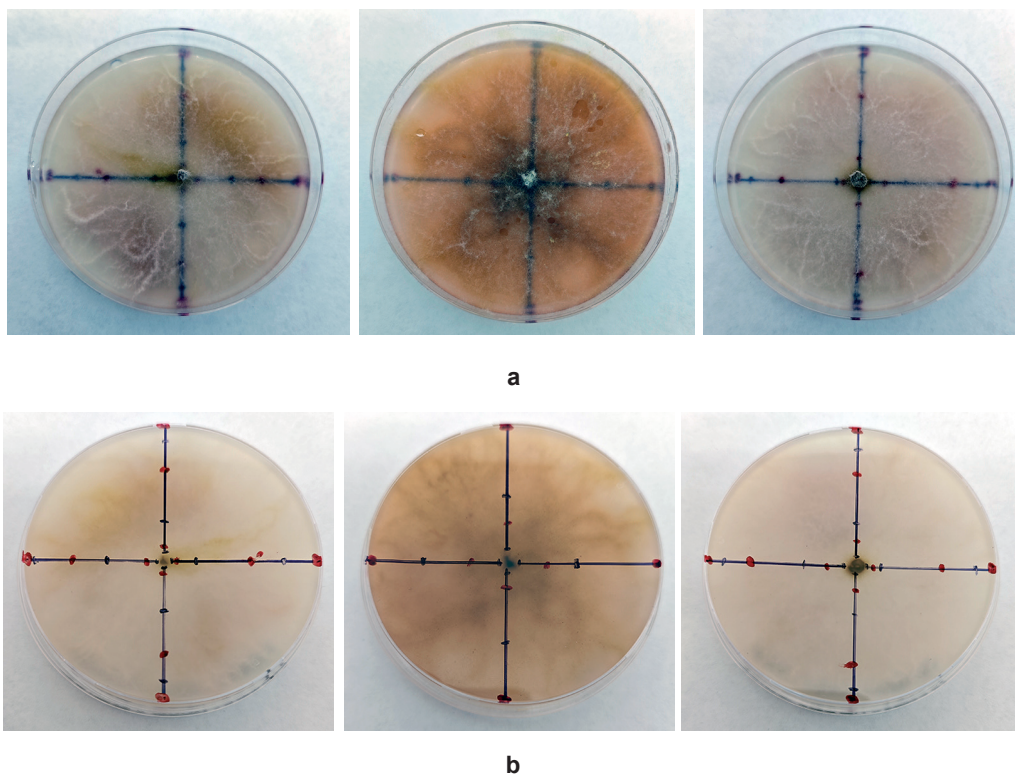


Fig. 3. Ten-day-old cultures of *B. cinereolilacina* from samples near Preobrazhenski Monastery: (a) upper surface; (b) lower surface.

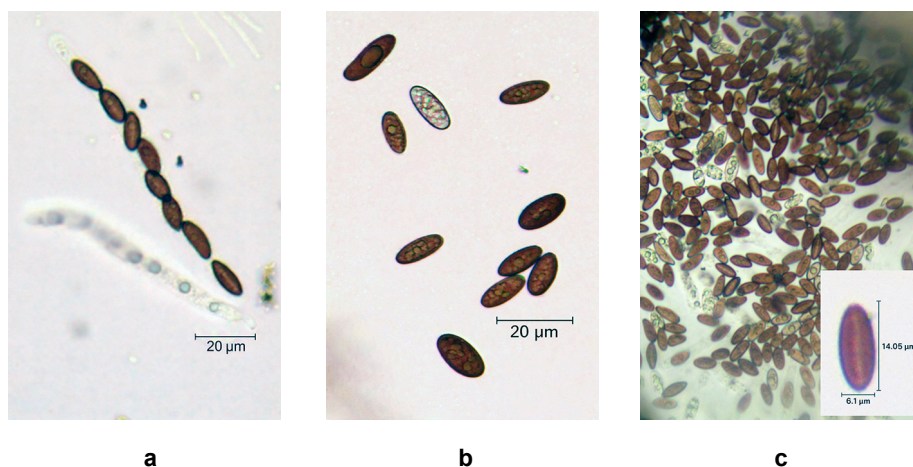


Fig. 4. Asci (a) and ascospores (b, c) in water mounts isolated from stromata of *B. cinereolilacina* near the Preobrazhenski Monastery.

Table 2. Dimensions of ascospores and conidia.

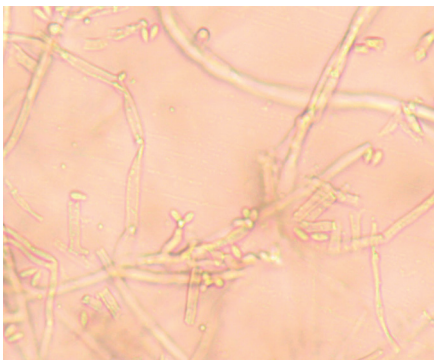
Site	Spores number	Mean length (min-max), standard variation, μm	Mean width (min-max), standard variation, μm	Spores number	Mean length (min-max), standard variation, μm	Mean width (min-max), standard variation, μm
ascospores				conidia		
Preobrazhenski Monastery	360	13.35 (7.35–19.25) 1.48	6.3 (3.68–7.68) 0.5	50	6.9 (4.98–7.9) 0.75	3.5 (2.65–4.1) 0.3
San Stefano	100	13.15 (10.53–15.7) 1.15	6.25 (4.93–8.35) 0.63	330	5.43 (3.63–8.23) 0.75	3.18 (2.43–4.35) 0.3
Bozhuritsa	120	13.5 (9.2–17.7) 1.55	6.15 (4.95–7.38) 0.53	-	-	-

× (4.5–)5.5–7 μm .

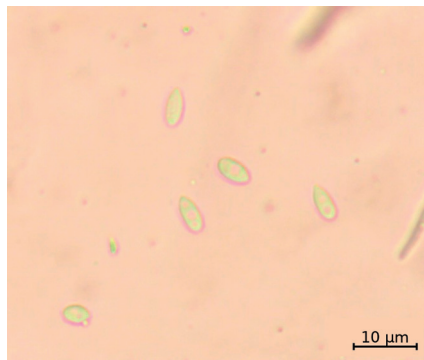
The morphological characteristics of the ascospores isolated in the present study also correspond to the description by these authors, who characterised the ascospores as light brown to brown, unicellular, ellipsoid, nearly equilateral, with broadly rounded ends, smooth-walled, 12–16(–17.5) μm long and (4.5–)5.5–7 μm wide, bearing a straight germ slit along the

length of the spore on both sides (Ju et al. 1998). A similar description was provided by Pouzar (1979), who reported that the ascospores possess a double, bilateral germ slit.

The measured conidia (Fig. 5) were formed on the mycelium of the isolated cultures. According to Granmo and Petrini (1996), the anamorph of *B. cinereolilacina* is *Nodulisporium*-like, as described for



a



b

Fig. 5. Anamorphic structures of *B. cinereolilacina* observed in water mounts from cultures isolated near Preobrazhenski Monastery: (a) hyphae bearing conidiogenous structures; (b) conidia exhibiting size and shape variability.

other species of the genus *Biscogniauxia* (*B. dennisii* (Pouzar) Pouzar, *B. marginata* (Fr.) Pouzar, *B. nummularia* (Bull.) Kuntze). Our data confirm that conidia exhibit considerable size variability. Considering both localities, conidial dimensions ranged from 3.63 to 8.23 μm in length and from 2.43 to 4.35 μm in width.

In isolates from the Preobrazhenski Monastery, conidia measured 6.9 (4.98–7.9) $\times$ 3.5 (2.65–4.1) μm , corresponding well to the description provided by Granmo and Petrini (1996) for *B. cinereolilacina*: ellipsoid to ovoid conidia with a slightly truncate base, hyaline to light brown, measuring 6–9 $\times$ 2.5–3.11 μm . Conidia formed on the mycelium of cultures isolated from San Stefano measured 5.43 (3.63–8.25) $\times$ 3.18 (2.43–4.35) μm .

Discussion

In Bulgaria, *B. cinereolilacina* had been recorded only sporadically, beginning with a single record on *T. tomentosa* (Kuthan and Kotlaba 1988) and followed by a recent observation in an urban environment (Ivanov et al. 2026). The new records presented here indicate that during the period following its initial detection (1983–2025), the species has considerably expanded its distribution in the country. This expansion may be linked to the extreme temperature and precipitation fluctuations observed in recent years. At the same time its apparent rarity may partly reflect under-detection rather than true scarcity. No evidence of large-scale host mortality or widespread decline attributable to the species was observed at the time of the study, indicating that its current ecological impact remains limited. This situation corresponds to its conservation status in Northern Europe. In Sweden, the species

is classified as Vulnerable in the Swedish Red List (Westling 2015, Bratteby 2017) and is included in the Norwegian Red List (2006) under the category Near Threatened (Kålås et al. 2006). Zíbarová and Kout (2017) have also recommended that the species be considered for inclusion in the Czech Red List of macromycetes and is now listed as Near Threatened (NT) (Zíbarová et al. 2024).

The examined specimens of *B. cinereolilacina* collected from *T. tomentosa* in the present survey correspond to the established morphological circumscription of *Biscogniauxia*. Stromata were readily separable from the bark, and the ascospores were predominantly symmetrical. The characteristic purplish colouration of young stromata, that gradually turns grey, together with the presence of a rounded germ pore at both ends of the ascospores, clearly distinguishes *B. cinereolilacina* from other European representatives of the genus, which typically possess black stromata (Ju et al. 1998). The consistency of these traits across newly documented populations supports their taxonomic reliability and confirms that the species retains a stable morphological identity under local conditions. Cultural characteristics of the isolates likewise correspond to published descriptions, showing growth patterns comparable to those reported by Granmo and Petrini (1996), despite differences in culture medium.

The host association is consistent with the recognised ecological specificity of *B. cinereolilacina*, which has been described as a narrowly specialised species restricted to *Tilia* spp. (Pouzar 1986, Nordén et al. 2002). Its occurrence in both natural and urban environments in Bulgaria corresponds with previous findings from other regions (Bratteby 2017). Similarly, its presence on dead woody tissues as well as on

dead parts of living trees agrees with earlier observations. The species has been reported to occur across different stages of wood decay and to show a preference for older trees with thick bark. This pattern was also observed at the Preobrazhenski Monastery and San Stefano sites, whereas records from younger trees, such as those at the Bozhuritsa site, were less frequent. Such ecological behaviour is characteristic of xylariaceous fungi associated with long-lived woody substrates (Hallqvist and Aronsson 2016, Bratteby 2017).

Recent studies indicate that the distribution patterns and epidemiology of several species of the genus are undergoing change in parts of Europe. Increased reports of *B. mediterranea* and *B. nummularia* have been associated with warmer conditions and recurrent drought, with water stress repeatedly identified as a key predisposing factor enhancing host susceptibility (Nugent et al. 2005, Patejuk et al. 2022). Elevated temperatures and reduced air humidity may contribute to host dehydration and reduced resistance, while simultaneously favouring fungal growth and sporulation. Long-term climatic trends are relevant when interpreting shifts in tree-fungus interactions. The decade 2011–2020 was identified as the warmest globally on record, and Bulgaria follows this pattern, including a record positive temperature anomaly of +2 °C in 2019 (Marinova and Bocheva 2023). Reviews further suggest that sustained climatic change can influence the geographical ranges and ecological roles of tree-associated fungi, potentially modifying their frequency and host interactions (Luchi et al. 2015, Burdon and Zhan 2020). The documented climatic trends provide relevant environmental context when considering the future dynamics of stress-responsive fungi.

The ability of *Biscogniauxia* species to exist in host tissues in a latent and asymptomatic state suggests a flexible ecological strategy rather than a strictly pathogenic one. Duration of this latent phase appears to be strongly influenced by environmental conditions and host physiological status (Saikkonen et al. 1998, Henriques 2015). Recognition of an endophytic stage, together with the capacity for rapid transition to pathogenicity (Petrini et al. 1992), further supports the view that these functional categories are context-dependent rather than fixed. During this stage, the fungi do not induce visible symptoms and are therefore considered endophytes, as they inhabit living plant tissues without causing damage (Petrini 1991). Under favourable conditions for fungal development and reduced host resistance, invasion of woody tissues may be extensive and, in severe cases, lethal within a single growing season (Petrović et al. 2024). A comparable pattern has been documented for *Hypoxylon atropunctatum* (Schwein.) Cooke on oaks (Bassett and Fenn 1984). This highlights the importance of considering latent infections and environmental stress as key factors in understanding the ecological behaviour and potential impact of species within the genus.

The recent expansion of *B. mediterranea* in Bulgaria is of particular relevance (Slavov and Bencheva 2024). This species has shown rapid spread and increasing host range, including recent records on *Quercus* spp. (Bencheva and Doychev 2022, Georgieva et al. 2024a,b) and on *Celtis australis* L., previously regarded as resistant (Slavov et al. 2025). Taken together, these examples highlight the importance of stress-mediated transitions and latent infections in understanding the dynamics of xylariaceous fungi.

The endophytic behaviour and path-

ogenic potential of *B. cinereolilacina* remain insufficiently understood, largely due to the limited number of European records and the lack of comprehensive data on its behaviour under natural conditions. Although the present study demonstrates an expanded distribution in Bulgaria, its functional role in the investigated stands cannot yet be fully defined. Despite its phylogenetic proximity to aggressive pathogens such as *B. mediterranea* and *B. nummularia*, no signs of active pathogenicity were detected in the surveyed localities. All findings were confined to dead branches or necrotic stem portions of living trees, and no large-scale decline of *T. tomentosa* attributable to this fungus was observed. Nevertheless, considering the demonstrated ecological flexibility within the genus, continued precautionary monitoring is warranted.

Given that natural forests of silver lime represent endemic habitats and are classified as threatened in Bulgaria, the confirmed presence of *B. cinereolilacina* in such stands is of conservation significance. The current absence of extensive damage should therefore be interpreted cautiously, particularly in light of the demonstrated flexibility within the genus. Systematic investigation of *Tilia* stands exhibiting the described symptoms is therefore advisable to clarify the behaviour and potential future significance of the species.

Conclusions

This study identifies *Biscogniauxia cinereolilacina* as the fungus associated with dieback symptoms of *Tilia tomentosa* in three newly documented localities in Bulgaria, based on morphological examination and cultural characterisation of iso-

lates. It is among the first detailed investigations of this rare and poorly documented species in Bulgaria and Europe. These findings substantially expand the known distribution of the species in the country and confirm its diagnostic morphological traits under local conditions.

Extreme temperature variability, together with the alternation of prolonged drought and periods of heavy precipitation observed in recent years, provides a broader environmental context in which distributional changes and shifts in activity of stress-responsive fungi of the genus *Biscogniauxia* may occur. A similar phenomenon has already been observed in Bulgaria in oak stands under the influence of *Biscogniauxia mediterranea*, suggesting that comparable environmental drivers may explain the observed expansion of *B. cinereolilacina* during the period since its initial record (1983–2025). Although no large-scale damage to linden trees has been recorded to date, ongoing climatic changes necessitate continuous monitoring of tree health to ensure the timely implementation of appropriate conservation measures.

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