



A. Conidial stroma (left), showing an ostiole in the centre of the disc, and not fully formed ascomatal stroma (right), with one ostiolar neck visible and a faint suggestion that others are about to protrude (bar = 1 mm). **B.** Horizontal section of stroma showing multi-chambered conidioma (right), with the cut away bark adjacent (left) showing the stromatal disc and an ostiole above the radially arranged locules (bar = 1 mm). **C.** Vertical section of stroma showing cluster of necks rising from ascomata and gathering in the stromatal disc (bar = 250 μ m). **D.** Ascus and ascospores (bar = 10 μ m). **E.** Ascus (bar = 10 μ m). **F.** Ascospores (bar = 10 μ m).

Valsa viburni Fuckel, *Jahrbücher des Nassauischen Vereins für Naturkunde* **23–24**: 201 (1869–1870, publ. 1870). [IndexFungorum 236595]
Engizostoma viburni (Fuckel) Kuntze, *Revisio Generum Plantarum* **3**(2): 475 (1898). [IndexFungorum 526168]

Diagnostic features. On twigs of *Viburnum*; stromata variable in size, immersed and erumpent to form a prominent greyish disc; ectostroma usually encircled by a \pm conspicuous thin blackish line; a similar ventral line occasionally present underneath ascomatal stromata; teleomorph ostioles inserted centrally on the disc and often seen as a projecting cluster; ascospores and conidia colourless, 1-celled, allantoid.

Description on natural substratum. Colonies with anamorph and teleomorph intermixed, or in separate stromata, or occurring on different twigs. *Anamorph.* *Conidiomatal stromata* in general appearance quite similar to those of teleomorph, except for smaller size and usually single ostiole; stromata subglobose to ovoid, flattened, 0.5–1.5 mm diam., submerged and erumpent to show a disc; stromatal disc prominent, up to 500 µm diam., ± circular, whitish or light grey to ashy, appearing scurfy, composed of ectostroma, normally with 1, rarely 2 or 3 ostioles; ostioles black, rounded to elliptical, sometimes slightly compressed, usually projecting above the disc surface; ectostroma greyish to dark grey inside, surrounded at the sides by a thin blackened layer clearly visible in tangential sections through its upper part and gradually disappearing towards the stromatal base; entostroma not distinct; ventral black zone line not observed. *Conidiomata* circular, elliptical or irregular, multi-chambered, comprising numerous radially arranged locules connected in the centre, each with additional invaginations. *Conidiophores* unbranched or branched, colourless, thin-walled, smooth, embedded in gelatinous matrix, 9–15 × 2 µm. *Conidiogenous cells* cylindrical, slightly tapered at the apex, colourless, thin-walled, smooth, 6–8(–11) × 1.5–2 µm, each with a minute collarette and a little periclinal thickening. *Conidial development* by percurrently proliferating replacement wall-building apices with no increase in the length of the conidiogenous cell ('phialidic'). *Conidia* allantoid to nearly straight, aseptate, colourless, thin-walled, smooth, (3.6–)4–4.8(–5.2) × 1.5 µm. *Teleomorph.* *Ascomatal stromata* sparse or densely scattered, subglobose and flattened to conical truncate, sometimes irregular, occasionally confluent, variable in size, 0.5–2(–2.5) mm diam. at the base, immersed in the bark and erumpent through the periderm as a disc. *Stromatal disc* prominent, whitish grey, ashy, sometimes olive, tan to ochre or cinnamon, circular, ovoid, seldom slit-like, up to 1 mm diam., comprised of ectostroma. *Ectostroma* inside talc grey to brownish grey, quite distinctly surrounded from top to bottom of the ectostromatic cone by a thin blackish grey layer gradually disappearing below. *Entostroma* not clearly distinct; sometimes a very fine blackish grey layer seen below ascomata which gradually becomes invisible at the sides. *Ascomata* (3–)8–12(–19) in each stroma, arranged in a circle, laterally inclined, black, globose or subglobose, with long ostiolar beaks thicker at the top. *Ostioles* rounded or truncated, furfuraceous or indistinctly striated, usually centrally inserted, appearing on the disc as a ± tight cluster, often slightly (occasionally strongly) projecting, or at the same level as disc surface, or rarely below. *Ascomatal wall* 20–30 µm wide, outside appearing as a *textura epidermoidea*; in longitudinal section of the basal part, the outer layers composed of dark brown cells forming a *textura angularis*, toward the inside gradually turning into a few layers of pale cells forming a *textura prismatica*. *Asci* clavate, subclavate, rarely spindle-shaped, with a fairly long stalk, unitunicate, 50–68(–77) × 7–10 µm, readily becoming detached at the base and then freely floating, with an apical refractive ring which does not turn blue in iodine, 8-spored. *Ascospores* allantoid, slightly tapered at both ends, aseptate, colourless, thin-walled, smooth, (9.5–)11–13(–16.5) × (1.8–)2.5–3.5(–4.2) µm, with homogeneous or fine-grained contents. *Paraphyses* not observed.

ASSOCIATED ORGANISMS & SUBSTRATA: **Plantae.** *Viburnum lantana* L. (branch, twig). **Associated organism of type specimen.** *Viburnum lantana*.

INTERACTIONS & HABITATS: A colonizer of shoots, twigs and smaller branches of *Viburnum*. Colonization initially, at least sometimes (URBAN, 1958) on living plant parts, where it may be a symptomless endobiont (nothing is known about this role) or parasite. Usually saprobic by the time conidiomata and ascomata are produced. Colonized plant parts remaining attached, or falling to the ground. Nothing is known about interactions or associations with organisms other than plants, and nothing is known about the role of this species in any food chain.

GEOGRAPHICAL DISTRIBUTION: EUROPE: Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Italy, Romania, Switzerland, Ukraine.

All records are probably within the natural distribution of this species. Altitudinal distribution information lacking.

ECONOMIC IMPACTS: No evaluation has been made of any possible positive economic impact of *Valsa viburni* (e.g. as a recycler, as a source of useful products, as a provider of checks and balances within its ecosystem, etc.). No reports of negative economic impact have been found.

INFRA-SPECIFIC VARIATION: None noted.

DISPERSAL & TRANSMISSION: By conidia released in gummy masses and dispersed by water and/or invertebrates, and by violently ejected airborne ascospores. Timing of spore release, the identity of invertebrate agents of dispersal, benefits to those agents, distance of dispersal and mechanisms of colonization are all unknown.

CONSERVATION STATUS: Information base. 15 records (specimens, databases and bibliographic sources combined, excluding duplicates) from at least 1870 to August 2008, with observations in April, May, June, July, August and September. **Estimated extent of occurrence** [calculated using <http://geocat.kew.org>]. About 1.5 million km². **Estimated area of occupancy** [calculated using <http://geocat.kew.org>]. About 30 km². The method for estimating area of occupancy has produced an artificially low figure. This species is likely to be under-recorded, particularly in recent years because of the small and declining numbers of people with the skills to search for and identify it. It nevertheless seems to be rare (known by a single record from each listed country except Ukraine, where it was specifically sought and still only six records were generated). The small number of recent records may be a cause for concern. The associated plant is a common species and likely to be of Least Concern from a conservation viewpoint. **Population trend.** Not known. **Threats.** No specific threats have been identified. **Evaluation.** Using IUCN criteria (IUCN SPECIES SURVIVAL COMMISSION. 2006 IUCN Red List of Threatened Species [www.iucnredlist.org]. Downloaded on 15 May 2006), the species is assessed globally as Data Deficient. **In situ conservation actions.** None. **Ex situ conservation actions.** No living strains of this species were found in a search of the ATCC, CABI, CBS and ICMP culture collection on-line catalogues.

NOTES: Several subgenera have been erected within the genus *Valsa* Fr., and there has been some discussion about which is most appropriate to house this species. FÜCKEL (1870), describing *V. viburni* from a collection made by Morthier in the Jura Mountains, placed it in subgen. *Leucostoma* Nitschke, although his reasons for doing so are not clear. That placement seemed doubtful to PETRAK (1940) who provided a fuller description of the species. In his collection of *V. viburni* from Austria the blackened layer characteristic of subgen. *Leucostoma* was missing. He stated that this was the only divergence from Fückel's description, and concluded that the fungus was a typical *Euvalsa*, close to *V. ambiens* from which it differed in the appearance of ostioles, smaller asci and, particularly, much smaller spores.

JACZEWSKI (1894) reported that type material and others specimens of this fungus collected by Morthier are stored in the Fungal Reference Collection with the Herbarium Barbey-Boissier. URBAN (1958) examined one of those specimens and confirmed that characteristic features of the species were present, notably very long ostiolar beaks, rounded and thickened at the top and penetrating disc in a tight bundle, a brownish grey ectostroma, asci up to 50 × 9.5 µm, and ascospores 11–15 × 2.5–3.5 µm. He also suggested (URBAN, 1957, 1958) that *V. viburni* belongs to the subgeneric sect. *Circinatae* Nitschke and, in general appearance, differs from *V. ambiens* mainly by ostioles penetrating the disc centrally. In addition, he noticed an important characteristic of the inner structure of the stroma which is the well-developed ectostroma outlined by a lateral blackened layer. We examined another original collection stored in Fungal Reference Collection at the National Botanic Garden of Belgium (Herbier Barbey-Boissier, no. 231, BR 99227,93). This specimen shows the same features typical of *V. viburni*, including stromata encircled and underlined by a narrow blackish layer. In our opinion, this is one of the most distinguishing characters of the species which is probably unique in the genus.

The various confusions with this species may have resulted because earlier authors each examined only one collection. In our observations of more extensive material, the blackened layer around the ectostroma and the occasional black ventral line are less conspicuous in stromata of some specimens while in others they are obvious. In the latter case, some tangential sections through the ectostroma could give the impression that this fungus should belong in the genus *Leucostoma*. This may be the reason why the fungus was originally placed by FÜCKEL (1870) in subgen. *Leucostoma*. Since structures typical of this subgenus are not present, however, we regard this species as belonging within sect. *Circinatae* of the genus *Valsa*.

URBAN (1958) was apparently the first to observe and provide a description of the anamorph based on the specimen collected by Morthier, although in Fuckel's diagnosis the anamorph is indicated as unknown ['Fungus spermogonium, ignotus']. We also observed the anamorph in another examined original specimen (see above). Apart from that, URBAN (1958) reported the same anamorph in the only collection of the fungus from Czech Republic. In most Ukrainian collections conidiomata are present, either intermixed with stromata of the teleomorph, or sometimes separately on other twigs (the ectostroma characteristic of this species is present in both anamorph and teleomorph, although the ventral black line occasionally present in the teleomorph seems to be lacking in conidiomatal stromata). No Latin name has been cited for the anamorph in the present description: three species of *Cytospora* have been described on *Viburnum* (*C. lantanae* Bres., *C. viburni* Fautr. and *C. opulina* Allesch.), the first two on *V. lantana*. The terse protologues provide insufficient morphological information. To determine which might be the anamorph of *V. viburni* would require re-examination of type specimens and molecular analyses of fresh or recent collections.

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