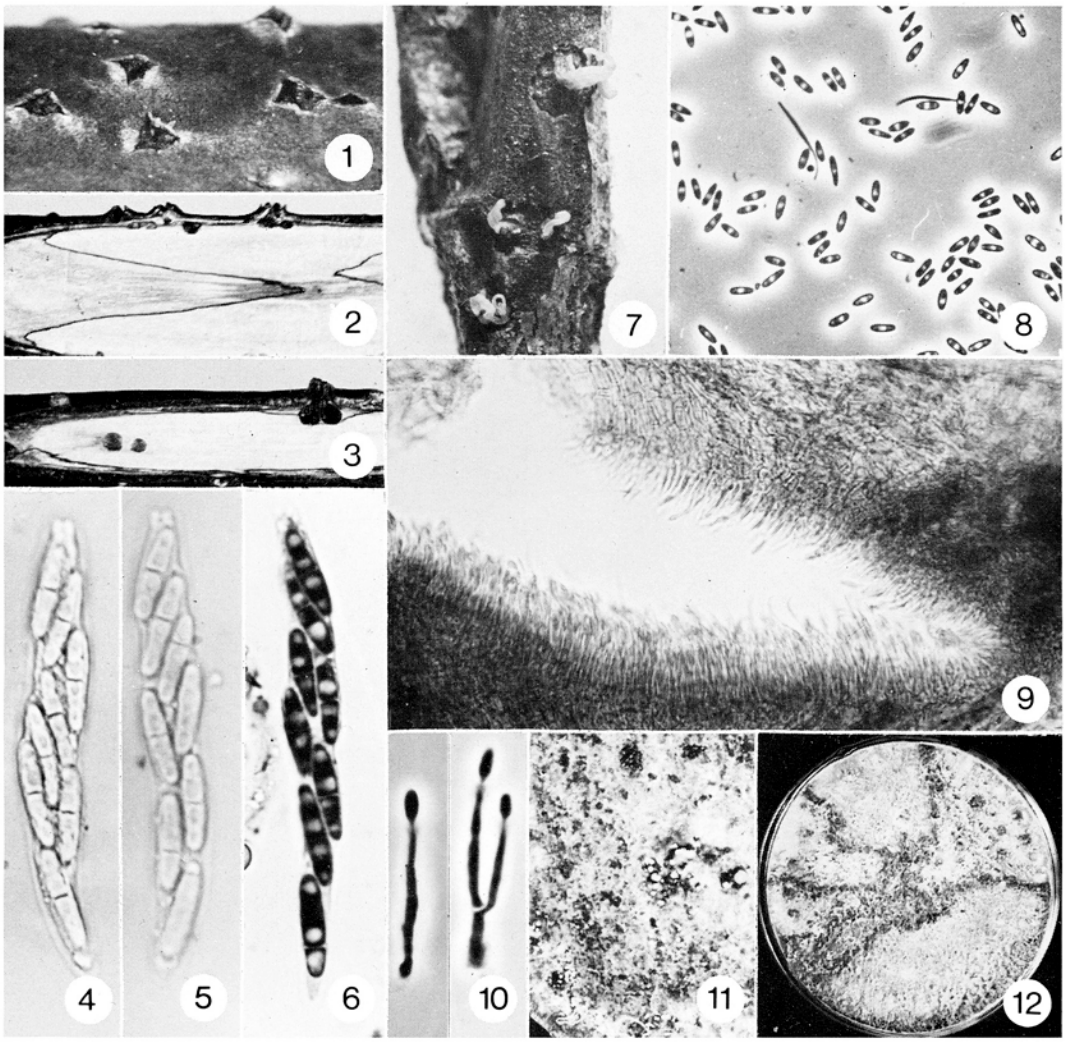
DIAPORTHE ALLEGHANIENSIS



1-6, Ascigerous state on the host; 1, ostioles, surface view (× 4), 2,3, sections through twigs with ascomata (× 4), 4-6, asci (× 1150). 7-10, pycnidial state on the host; 7, conidial tendrils on pycnidia (× 10), 8, α- & β-conidia (phase × 700), 9, vertical section through portion of pycnidium (× 350), 10, conidiophores with young conidia (phase × 1200). 11,12, ascospore cultures on 2% potato dextrose agar; 11, pycnidial stromata with conidial tendrils on aerial mat (× 1), 12, growth from germinated spores of one ascus (× 1/2). Figs. 1, 2, DAOM 45776; 3, DAOM 56996; 4-6, DAOM 56998; 7-10, DAOM 61533; 11, 12, DAOM 45777.

Diaporthe alleghaniensis R. Horner Arnold, Can. J. Bot. 45: 787. 1967.

ASCOMATA 300-800μ diam., scattered singly or clustered in one or more compact groups of (2-)3-6(-18) in a pseudostroma of altered wood and bark tissue. Pseudostroma delimited by a blackened marginal dorsal zone in the bark above the ascomata, and a blackened marginal ventral zone in the wood beneath the ascomata or at the sides of a group of ascomata. Ostioles prominent or not, convergent, cylindrical, black, erumpent through the dorsal zone which may be thickened and contain old pycnidial locules. ASCI 43-60(-65) × 4-6.5(-8)μ, unitunicate, astipitate, narrow cylindrical, apex truncate and thick-walled with a refractive ring around the apical pore. ASCOSPORES (10-)10.5-16(-18) × (1.5-)2.5-3(-3.5)μ, biseriate or irregularly biseriate in the ascus, cylindrical-ellipsoid, hyaline, straight or slightly curved, at first single-celled and uninucleate, later becoming 2-celled, spores divided

equally or unequally, occasionally remaining single-celled or becoming three-celled at maturity. Paraphysis-like remnants of interthecial tissue 5μ diam., septate, gelatinizing at maturity.

PHOMOPSIS STATE: PYCNIDIAL STROMATA in the bark of branches and the mesophyll of leaves, pulvinate, conical; 600-950μ diam., 500-600μ high on branches, the periderm adhering closely at first, later curved back; 200-250μ diam., 100-170μ high on leaves and young shoots; stromata of two weakly defined areas, an outer dark gray to black layer 100-120μ thick of mixed hyphal cells and altered bark cells, and a central pale gray or white part composed entirely of fungus tissue within which locules occur. PYCNIDIAL LOCULES variable in size, shape and number, but usually one locule or two coalescing locules within one stroma opening to the outside by 1-3(-15) irregular, circular or slit-like openings in the stromatic tissue on branches or by one central pore on leaves or shoots. CONIDIOPHORES(PHIALIDES) 3-26 × (1-)1.5-2(-2.5)μ, hyaline, sparingly branched and septate, or simple and continuous, arising from stromatic cells lining the locules. CONIDIA of two types: α-conidia (4-)5-8 × (1-)1.5-2(-2.5)μ, fusiform-elliptical, hyaline, one-celled, biguttulate; β-conidia 14-21(-25) × 0.7(-1)μ, filiform, blunt at one end, pointed and usually curved at the other, hyaline, one-celled. Intermediate types also occur. Locules may contain only α-conidia, only β-conidia, or both; conidia extruded from locules in cream or pale orange tendrils.

HOST: *Betula alleghaniensis* Britt., *Betula lenta* L., rare on *Betula papyrifera* Marsh.

DISTRIBUTION: Nova Scotia, New Brunswick, Quebec, Ontario.

COLLECTIONS (selected): Ascigerous state: On *B. alleghaniensis*, Ont., Dorset, X.1954, DAOM 41857 (R. Horner, J. Newman, A.W. Hill), Eel's Lake, S of Bancroft, IX.1953, DAOM 46315 (R.H., J.N., A.W.H.), Sisk Twp., Nipissing District, VII.1952, DAOM 56995 (R.H., W. Stachera, E. Lyon, A.W.H.), South March, V.1955, DAOM 41856 (J.N.), South River, VII.1952, DAOM 56996 (R.H., W.S., E.L., A.W.H.), Vennacher, IX.1953, DAOM 45776 (Holotype), DAOM 45777 (R.H., J.N., A.W.H.), Brewer Lake, Nipissing District, IX.1952, DAOM 56998 (W.S., E.L., R.H., A.W.H.). Que., Gatineau Park, XI.1950, DAOM 56989 (R.H.). On *B. lenta*, Ont., London, VIII.1904, Dearness Herb. 3083 and Fungi Columb. 2119 in DAOM (J. Dearness). *Phomopsis* state: On *B. alleghaniensis*, Nova Scotia, Churchview, C.B.I., VII.1948, DAOM 70905 (A.G. Davidson, D.E. Etheridge), Willowdale, VI.1948, DAOM 70881 (A.J. Skolko). New Brunswick, Alma, VIII.1948, DAOM 70879 (J.T.B. Kingston), Acadia Forest Expt. Sta., VII.1957, DAOM 60401 (R.H. Cochrane), Fredericton, IX.1948, DAOM 70909 (D.R. Redmond). Que., Gatineau Park, IX.1956, DAOM 61563 (R.H.). Ont., Callender, VI.1951, DAOM 61577 (R.H.), Chalk River, IX.1950, DAOM 61599 (R.H.), Dorset, X.1950, DAOM 61591 (R.H.), Ottawa, VII.1953, DAOM 61540 (R.H.), Sisk twp., Nipissing District, V.1951, DAOM 61576 (R.H.), Vennacher, V.1951, DAOM 61533 (R.H., M. Moss, W.S.). On *B. papyrifera*, Ont., Dorset, X.1954, DAOM 61605 (R.H., J.N., A.W.H.).

CULTURAL CHARACTERS: Growth rapid on 2% potato dextrose agar at R.T. (20-24°C), 45 mm radius in 5-7 days. Aerial mat at first white, wispy-matted, later woolly-matted at center and subfelty at edge, azonate or distinctly zonate, almost white, pale olive-gray, or dark olive, a black pseudostromatic layer of mycelium 1-2 mm thick at surface of agar over whole plate or in patches or zones. Two types of pycnidial stromata may be produced: simple, black, less than 1 mm diam., containing a single locule with mature conidia in one week; and compound, tuberculate stromata 2-4 mm diam., 2 mm high, composed of a basal stroma covered with small hemispherical projections each containing a single locule with mature conidia in 6-8 weeks. Conidia and conidiophores like those on the host. Optimum temperature for growth and formation of conidia 25° C.

NOTES: Common in the *Phomopsis* state and the cause of a canker and foliage disease of *B. alleghaniensis* (Arnold, R.H., Can. J. Bot. 45: 783-801. 1967, ibid. 48: 1525-1540. 1970). It appears to be almost entirely restricted in nature to hosts in the yellow birch group, although infections were obtained on white birch (*B. papyrifera*) seedlings artificially inoculated. The ascigerous state has not been seen on white birch and the *Phomopsis* state is rare on that host. It has been reported as common on diseased birch in U.S.A., in Maine and New Hampshire (Hahn and Eno, Pl. Dis. Reptr. 40: 71-79. 1956; Hansbrough, Can. Dept. Agr., Rept. Symp. on Birch Dieback, Ottawa, pp. 128-135. 1953), and in Michigan (K.J. Kessler, Pers. Comm., 1967; J.A. Ohman, Pers. Comm., 1963 & 1965).

Ruth Horner Arnold

National Mycological Herbarium, Biosystematics Research Institute
Research Branch, Agriculture Canada
Ottawa, Ontario, K1A 0C6

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