



1, Portion of raspberry cane, infected the previous year, bearing mature erumpent ascostromata in the whitish lesions (shaded) ($\times 1$); 2, conidia and conidiogenous cells; 3, ascostroma (ca $\times 450$); 4, portion of ascostroma wall; 5, ascus; 6, ascospores. 1, 3, 4, 5, 6, DAOM 19074; 2, DAOM 36174. Scales = 10μ .

Didymella applanata (Niessl) Sacc., Syll. Fung. 1: 546. 1882.

≡ *Didymosphaeria applanata* Niessl, Oester. Bot. Ztschr. 25: 129. 1875.

= *Mycosphaerella rubina* (Peck) Jacz., in Stevens, Plant Disease Fungi, p. 172. 1925.

≡ *Sphaerella rubina* Peck, Ann. Rept. N.Y. State Museum 48(1): 114. 1892.

Stat. conid.:

Phoma sp.

ASCOSTROMATA subepidermal in the cortex of the stem, numerous (gregarious), globose to subglobose, dark brown to almost black, minute, $125-145\mu$ high by $185-225\mu$ wide, papillate, erumpent or ascostromata becoming superficial when epidermis falls away. In vertical section, the ascostroma wall is irregular in thickness, $16-20\mu$, consists of 2-5 outer cell layers of dark brown thick-walled, angular cells and several inner layers of lightly pigmented to hyaline, tangentially flattened thin-walled cells. PSEUDOPARAPHYSES hyaline, septate, $2-3\mu$ diam., persisting in mature ascostromata. ASCI bitunicate, cylindrical $50-65 \times 10-13\mu$. ASCOSPORES hyaline, obovoid to oblong, equilateral to slightly inequilateral, apex acute to obtusely rounded, base generally acutely rounded, 1-septate at the

middle, or slightly below, the upper cell distinctly wider than the lower cell, constricted at the septum, smooth, biseriolate in the ascus, $13.5-16.5(-18) \times 5.5-7\mu$.

HOST: Stems (canes), leaves and buds of *Rubus idaeus* L.

DISTRIBUTION: Collections in DAOM from Ontario, Saskatchewan, British Columbia (see NOTES).

COLLECTIONS: Ont., Ottawa, 20 Oct. 1921, DAOM 36174 (F.L. Drayton); Pembroke, 30 July 1946, 19074 (J.R. MacCrimmon); Warren, 27 May 1942, 7783 (A. Seguin); Collingwood, 22 April 1953, 40348 (C.B. Kelley); St. Catherines, Dec. 1913, 36176 (W.A. McCubbin), 16 June 1926, 85826 (L.C. Coleman). Sask., Pontrilas, 20 Aug. 1942, 36175 (P.M. Simmonds & R.C. Russell). B.C., Mission, Aug. 1936, 8227 (W. Jones).

NOTES: In addition to the provinces listed under DISTRIBUTION, spur blight of raspberries also occurs in Prince Edward Island, Nova Scotia, New Brunswick, Manitoba and Alberta or wherever raspberries are grown (I.L. Connors, Annotated index of plant diseases in Canada. Res. Br. Publ. 1251. Canada Dept. Agric., Ottawa).

An excellent paper by L.W. Koch (Phytopathology 21(3): 247-287. 1931) provides a thorough description of the disease symptoms, a detailed description of the fungus and clarification of the perfect/imperfect state connections derived from culture studies and inoculation experiments. According to Koch, the most striking symptoms (appearing as early as June 25 in Ontario) are the purple-brown discolorations (lesions) on the canes and the leaves and buds. The discolored areas generally are found on the lower half of young canes and usually originate at the node just below the point of attachment of the leaves. Less frequently, the discoloration originates in the internodal regions, on the buds, the leaf petioles and the main veins of the leaves. By August, often all of the lower cane has become purple-brown. Leaves are lost; bud development is interfered with so that, by autumn, they are severely dwarfed or killed outright. By late summer, small scattered *Phoma* pycnidia are present. The cortex of the cane splits, the canes dry out and become very brittle. The purple-brown lesions turn a gray-white, because of the death and detachment of the superficial layers. During the autumn, immature ascostromata of *D. applanata* form, eventually coming to maturity the following spring. Conidia of the *Phoma* sp. also may be discharged in the spring at intervals along with the ascospores following a rain shower. Canes infected the previous year produce few or no fruit spurs on the lower half of the canes; only the upper parts of the plants produce berries. While losses from spur blight may be severe, A.T. Bolton (Phytoprotection 47(2): 84-88. 1966) states that the disease is not serious in well-cared-for plantations but only when the rows become too thick or weeds shade the base of the plants.

In culture studies (Koch loc. cit.), all monoascospore isolates produced pycnidia of *Phoma* sp. Inoculation of raspberry plants with cultures originating from monoascospore isolates produced typical spur blight lesions, *Phoma* sp. pycnidia and eventually mature ascostromata of *D. applanata* the following spring. A *Coniothyrium* sp. frequently associated with spur blight was shown to be unconnected with *D. applanata*, and the conidial state of *Leptosphaeria coniothyrium* (Fckl.) Sacc. (\equiv *Melanomma coniothyrium* (Fckl.) L. Holm).

Only a few *Phoma* pycnidia, $112.5-150\mu$ diam., were found on one DAOM collection (36174); the hyaline, ovate to elliptical, often biguttulate conidia measure $5.5-6.5 \times 2.5-3\mu$. These measurements agree with the descriptions of Koch (loc. cit.) and R. Corbaz (Phytopath. Zeit. 28: 391-392. 1957) for the conidial state of *D. applanata*. The measurements of the pycnidia and conidia given by Koch (loc. cit.) are as follows: pycnidia from naturally infected canes $147-268 \times 105-231\mu$ (mean size $208 \times 187\mu$); pycnidia on 2% PDA $114-170 \times 80-144\mu$ (mean size $143 \times 118\mu$); conidia on naturally infected canes $5.0-11.2 \times 1.75-3.8\mu$ (mean size $7.1 \times 2.9\mu$); conidia on naturally infected leaves $5.3-8.0 \times 3.0-3.8\mu$ (mean size $6.6 \times 3.3\mu$); conidia on 2% PDA $3.5-8.4 \times 1.5-3.6\mu$ (mean size $5.5 \times 2.3\mu$).

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