

# A CENANGIUM ASSOCIATED WITH SOOTY-BARK CANKER OF ASPEN<sup>1</sup>

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## SUMMARY

Sooty-bark canker of aspen, described here for the first time, is reported from the central Rocky Mountains. It is common mainly in mature and over-mature stands and occurs at various heights on the trunk. The bark becomes blackened and remains intact over the cankered area. In 3 to

5 years, a discomycete fungus, *Cenangium singulare* (Rehm) comb. n. fruits abundantly on the cankered bark. The fungus may occur in the centers of cankers before they girdle the affected trees, but it is most abundant on diseased bark of killed trees.

Aspen (*Populus tremuloides* Michx.) is subject to a number of canker diseases. Meinecke (3), in his study of diseases of aspen in Utah, mentioned a common trunk canker that is characterized by concentric areas of exposed wood surrounded at the canker margins by flaring, outrolled, dead bark. In Colorado, this canker occurs on occasional trees scattered through young or old stands. It is also abundant in localized areas where almost every tree is infected. Often an affected tree may have a large, old canker near the base of the trunk and other progressively smaller cankers higher up. The writers have never observed a fungus associated with this type of canker, which Boyce (1) has referred to as "black canker of aspen."

Another large previously undescribed canker on aspen is common in most areas of the central Rocky Mountains. It is especially abundant in stands on the western slope of the Continental Divide in Colorado. It has been tentatively named sooty-black canker of aspen, and this paper presents a preliminary report of the canker and describes a fungus that seems to be consistently associated with it.

Sooty-bark canker is rather uniformly distributed through older or mature stands. It becomes especially abundant in timber that is dying from old age or other causes. The canker has seldom been found in young stands (up to 60 years), but is occasionally present in 60- to 80-year-old stands and sometimes abundant in stands 80-150 years old.

Sooty-bark canker develops rather rapidly and may girdle a tree in a few years. Cankers develop at any point on the trunk up to a height of 60-70 feet. Some-

times they start at old wounds, such as basal fire scars or sun scald injuries, but they may also start at points where there are no apparent injuries. Cankers may reach a length of 10-15 ft. on large stems before they girdle the tree. The bark over the cankered area usually remains intact and tightly attached to the wood, even after the tree dies (Fig. 1,A). The cankers are not conspicuous but may have a slightly target-like appearance where part of the outer white surface has flaked away in a somewhat zoned pattern exposing part of the blackened inner bark. Except for the thin white outer layer, the bark becomes a uniform sooty black. When the white outer surface is removed, the canker margin is very distinct (Fig. 1,B).

Young cankers do not fruit conspicuously, but frequently numerous fruiting primordia (pycnidia?) cause roughened areas near the margins. None of these have been collected in good sporulating condition. Small insects are often present and may feed on these fruiting bodies. *Cytospora chrysosperma* Fr. is sometimes found as a secondary fungus associated with these cankers, but it does not cause them.

The blackened bark usually remains tightly attached to the wood for several years after the trees die and fall to the ground. The fungus seems to cement the bark to the trunk and produces a peculiar pattern on the wood that is exposed after the bark finally weathers off (Fig. 1,D).

FRUITING OF CENANGIUM ON OLD BARK.—Apothecia usually develop abundantly on the old diseased black bark or underneath the loosened white surface layer (Fig. 1,C). They are light gray on the exterior and curled up in angular to hysteroïd shapes, which upon moistening open to reveal themselves as discoid or urn-shaped (Fig. 2).

The discomycete is present at all seasons and probably disseminates ascospores at any time of the year when moisture and temperature are favorable. The spores are forcibly ejected, indicating that they are disseminated by wind.

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FIG. 1. Sooty-bark canker of aspen. A) Canker at base of mature tree; B) Same canker with part of bark removed from margin; C) *Cenangium* fruiting bodies on old bark; D) Wood from which old diseased bark has weathered off.





FIG. 2. *Cenangium singulare* (Rehm). A) Closed apothecia; B) Apothecia opened or partly opened from exposure to moisture (magnified several times).

CLASSIFICATION OF THE ASPEN CANKER FUNGUS.—The discomycete described by Ellis and Everhart (2, p. 100) in 1888 as *Dermatea pruinosa* Ell. & Ev., collected on decaying bark in Colorado by Cockerell, appears to be the same as the fungus found fruiting so abundantly on the old sooty-bark cankers. Seaver placed it in *Cenangium* in 1951, making the combination *C. pruinosa* (Ell. & Ev.) Seaver (5, p. 300). Seaver quotes from a note by Ellsworth Bethel on an 1898 herbarium label that "this is abundant everywhere in the mountains where aspen is found." Its association with old cankered bark has not been mentioned previously.

Apparently the species had been considered a variety of *Cenangium populneum* by Rehm and pub-

lished as *C. populneum* (Pers.) Rehm var. *singulare* Rehm by Starbäck in 1895 (6, p. 19, Fig. 7). The description was copied by Saccardo and Sydow in 1899 (4, p. 796). The Ellis and Everhart name as given by Seaver (*C. pruinosa*) is preempted for a different fungus, *C. pruinosa* Ces. 1854. It is necessary, therefore, to rename it and the varietal name used by Rehm is proposed and raised to species rank as follows: *Cenangium singulare* (Rehm) comb. n.

HERBARIUM SPECIMENS EXAMINED.—The 6 herbarium specimens that follow were examined and seemed to be the same as those collected recently from old cankered aspen bark. The first 3 are from the New York Botanical Garden; loaned through the courtesy of Dr. D. P. Rogers. The other 3 specimens are in the National Fungus Collections, Plant Industry Station, Beltsville, Maryland, and give information on distribution.

Type specimen, *Dermatea pruinosa* Ell. & Ev., Colorado, 1888, coll. T. D. A. Cockerell.

Bethel No. 258-a, on aspen, Buena Vista, Colorado, August, 1898.

Another specimen as *Cenangium populneum* (changed from original *C. furfuraceum*), Colorado, no other data.

*Cenangium populneum* Rehm var. *solare* (error for *singulare* Rehm). Reliquiae Farlowianae 104 on bark of *Populus grandidentata*, New Hampshire, May 18, 1908, W. G. Farlow.

*Cenangium populneum* (Pers.) Rehm var. *singulare* Rehm on *Populus trichocarpa*, Priest River, Idaho, October 1920, coll. J. R. Weir, det. E. K. Cash, Forest Path. 71044; on *Populus* sp., Neebish, Mich. Oct. 1919, Herb. E. T. & S. A. Harper 1531, det. E. K. Cash.

*Cenangium pruinosa* (Ell. & Ev.) Seaver, on *Populus* sp., S. Aurora Ontario, Oct. 2, 1932, coll. H. S. Jackson, det. F. J. Seaver.

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