A BOTRYTIS DISEASE OF RIBES ODORATA WENDL.

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This is a disease of both leaves and shoots of *Ribes ordorata* Wendl., commonly known as golden currant or clove bush and is caused by a Botrytis species, most probably a strain of *B. cinerea* Pers. It was first discovered in a large cluster of these bushes eight years ago, and has been under observation each year since. The exact location is six miles west of Bloomington, Indiana. This clump of bushes is very large, having spread to some 20 feet in diameter and some of the canes reach to a height of six feet.

Fig. 1. "Die back" of golden currant produced by inoculation with Botrytis. Two lateral shoots have rapidly developed. These are larger than the main stem. (Much reduced.)

The most striking effect of the disease is the injury done to the young growing shoots. These are killed back, usually about six inches, the tips curling downward as they dry up. Figure 1 shows the characteristic appearance of such twigs. Conidiophores of the causal fungus may be seen surrounding and growing from these dead stems, especially near their tips. The infection appears to begin at the very tip of some terminal or lateral shoot. As it proceeds downward, the very young side branches also die and curl. Eventually, when its progress is

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halted by the older and more woody tissue farther down, the buds or side shoots below take the lead and develop very rapidly both in length and in diameter. Many of these newly formed lateral branches are much larger in diameter above than at the base. Usually several of these branches appear, giving a "witches' broom" effect. Occasionally these newly formed branches are, in turn, attacked at their tips and die back as did the original stem. Again, these side branches may die on account of the main stem having died down below their point of attachment.

On the leaves, wedge-shaped spots are usually formed, due to the death of some vein. The attack of veins is a thing naturally expected of a shoot-destroying organism. The start is sometimes back from the edge of the leaf, in which case an oval or circular spot is formed. This may spread gradually over a large area of the leaf. Conidiophores of the fungus always appear on the under surface of such leaves. These spots have purplish margins with brown centers which dry and fade to gray. Much defoliation occurs during seasons favorable to the fungus.

A few vigorous tips of canes in a clump of the same species of *Ribes* as the one upon which the *Botrytis* was found, were selected for inoculation. This clump of bushes has been growing on the Indiana University campus for some 20 years and is known never to have suffered from this disease. Spores in water merely placed upon these tender growing tips on July 6, 1924, produced by July 18—12 days later—the specimen from which the figure was made. The two large axillary shoots were thus very rapidly produced. However, it is interesting to note that the disease has not appeared in this clump since.

While no critical study of the causal Botrytis has been made, it seems, at least, to be a strain of *B. cinerea* Pers. This species is one of some 200. A number are known to be parasites whose virulence depends largely upon their ability to form extraordinarily vigorous mycelia and to attack their hosts at the most favorable time. The literature on *B. cinerea* Pers. is very voluminous and the writer will not discuss it here. Some of the hosts mentioned, however, are: strawberry, dahlia, geranium, lily, carrot, cranberry, fig, ginseng, syringa, peony, cyclamen, lettuce, grape, rose, bean, Prunus, horse-chestnut, and conifers including hemlock, pine, spruce, larch, and fir. Very recently a spur blight of pear in Oregon is noted by Zeller as being caused by *B. cinerea* Pers.

So far as the author is able to learn, this is the first time *B. cinerea* Pers. has been reported on *Ribes odorata* Wendl. It has, however been described on gooseberry, a near relative of golden currant by Salmon[1] in England in 1909, who states that the sclerotia produce both conidia and ascospores. In 1910 Salmon[2] gives to the fungus the name of Sclerotinia. He states that the stem and bases of the branches, the young wood, leaves, and wood are attacked.

[1] Salmon, E. S. The Sclerotinia (Botrytis) disease of gooseberry, or die back. Jour. Southeast. Agr. Col. Wye, 1909: 319-327.

[2] Salmon, E. S. Sclerotinia or die back of the gooseberry. Jour. Bd. Agr. 17: 1-9. 1910.

In the United States, the "die back" of gooseberry due to a Botrytis seems to have been first noted by Jackson[3] in Oregon in 1915. He states that it is common in Oregon. Heald and Dana[4] in 1924 state that "the terminal and leaf clusters of the current year's growth were killed back". In 1920, Warmald[5] in writing of the disease in England, gives *B. cinerea* Pers. as the cause of die back and says the asciger-ous stage is *Sclerotinia Fuckeliana* De By. Though we are not absolutely sure that the die back of gooseberries and the die back of golden currant described herein are identical, we feel reasonably certain of it. Future inoculation experiments will determine definitely the truth.

While we will not here discuss the parasitism or the species limitations of this fungus, it seems well to state that the location of the infected bushes is in a small, but not deep valley, where the air drainage is not of the best and that the plants receive considerable shade. Not a single summer has passed without the recurrence of the disease since its discovery, though there is much difference in its severity from year to year. In general, it is of less importance in seasons of dry summers, especially if such summers are preceded by dry spring seasons as in 1925 and in 1926. During the season just passed, it was less noticeable than in any season since 1918. This year, it first appeared about June 10. It was noted several times in July, but on only a few stems and leaves. During certain seasons, almost every stem and branch die back. It usually reaches the height of its severity in July.

[3] Jackson, H. S. Notes, observations and minor investigations on plant diseases. Oreg. Biennial Crop Pest and Hort. Rep. 1913-1914: 261-283. 1915.

[4] Heald, F. D., and Dana, B. F. Notes on plant disease in Washington. Botrytis diseases. Trans. Am. Mic. Soc. **43**: 136-144. 1924.

[5] Warmald, H. Fruit, Flower, and Veg. Trades Jour. (London). 1920-1921.