Plant Diseases.: VII. "Cluster-Cup" Disease of Conifers. (*Calyptospora Goeppertiana*, Tul. Kühn.)

Author(s): G. Massee

Source: *Bulletin of Miscellaneous Information (Royal Botanic Gardens, Kew)*, Vol. 1907, No. 1 (1907), pp. 1-3

Published by: Springer on behalf of Royal Botanic Gardens, Kew

Stable URL: <http://www.jstor.org/stable/4114886>

Accessed: 27-06-2016 08:46 UTC

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at
<http://about.jstor.org/terms>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

Royal Botanic Gardens, Kew, Springer are collaborating with JSTOR to digitize, preserve and extend access to *Bulletin of Miscellaneous Information (Royal Botanic Gardens, Kew)*

ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 1.]

[1907.

I.—PLANT DISEASES.—VII. “CLUSTER-CUP”
DISEASE OF CONIFERS.

(*Calyptospora Goeppertiana*, Jul. Kühn.)

(With Plate.)

G. MASSEE.

The term “cluster-cup” is used popularly in this country to designate the *Aecidium*-form of fruit of many of the “rusts” or *Uredines*. It appears in the shape of tiny white cups with frilled edges, filled with yellow spores, growing in dense clusters on the living leaves of many of our wild and cultivated plants. The fungus causing this disease is one of those parasites which, when opportunity offers, grows on two different kinds of host-plant during different periods of its development. The resting-spore stage grows on *Vaccinium*, and the “cluster-cup” stage on various conifers.

It has been proved, however, that when conifers are not forthcoming, the “cluster-cup” or *Aecidium*-stage can be left out of the cycle of development of the fungus, which continues to reproduce itself entirely on its *Vaccinium* host. On the other hand when *Vaccinium* and conifers grow together, the fungus certainly passes from the former to the latter, and often proves very destructive to young trees and nursery stock, causing defoliation early in the season. It may be mentioned that in some other “rusts” or *Uredines*, to which group the present fungus belongs, the *Aecidium*- or “cluster-cup” stage may drop out without in any way interfering with the continuation of the species. This frequently happens in the case of a rust of wheat—*Puccinia graminis*, DC. In many other rusts the “cluster-cup” stage has been permanently left out of the cycle of development.

1375 Wt 72 1/07 D & S 29 26873

CLUSTER-CUP DISEASE OF CONIFERS.

In Europe the resting-spore condition of this fungus has only been met with on the Cowberry—*Vaccinium Vitis-Idaea*, L. In addition to this host it also occurs on *V. Myrtillus*, L., and *V. Chandleri*, Jepson, in the United States. It has been recorded as occurring on *Salix* in the United States, but an examination of the specimen in the Kew Herbarium on which this report was founded, shows that the plant is *Vaccinium Vitis-Idaea*, L.

The "cluster-cup" stage occurs spontaneously on the Silver fir—*Abies pectinata*, DC., and on *A. Nordmanniana*, Spach. Infection experiments have shown that the fungus will also develop on *Abies nobilis*, Lindl., *A. magnifica*, A. Murr.; *A. concolor*, Lindl., *A. balsamea*, Mill., *A. Fraseri*, Lindl., *A. cephalonica*, Lond., *A. cilicica*, Ant. & Kotschy, *A. Pictita*, Forbes, *A. Pinsapo*, Boiss., and *A. Veitchii*, Lindl.

On the other hand *Tsuga canadensis*, Carr., and *T. Douglasii*, Carr., have resisted all attempts at infection.

The appearance presented by Cowberry plants when diseased is very striking. All the branches grow perfectly erect, the entire plant grows much taller than uninfected plants, and the leaves are much stunted. The fungus attacks the stem, which becomes much swollen and spongy in texture. The colour of the swollen stem is at first clear pink, gradually changing to brown and finally almost to black. The resting-spores or teleutospores of the fungus are produced in the epidermal cells of the swollen stem, and in the spring following the period of infection, germinate *in situ* and send delicate threads through the epidermis of the host-plant into the air. These threads bear very minute secondary spores, which are scattered by wind. Some of these spores alight on the stems of other Cowberry plants, and the same cycle of development is repeated. If young conifers happen to be growing near a diseased Cowberry plant, and the spores from the latter settle on the conifer leaves, the "cluster-cup" stage of the fungus develops and the spores it produces can infect neighbouring Cowberry plants, but cannot directly infect another conifer.

The Silver fir—*Abies pectinata*, DC., suffers most from the disease in this country, and also on the Continent; diseased specimens of *A. Nordmanniana*, Spach, have also been received from Wales.

In conifers the leaves only are attacked. About a month after infection two rows of white, cylindrical "cluster-cups," about half a line in length, appear on the under surface of the leaf; these "cluster-cups" or peridia are the fruit of the fungus and are filled with minute orange spores. Infection usually occurs in May, and by the middle or end of July diseased leaves have become yellow and soon fall. After the spores have been blown away, the silvery-white empty "cluster-cups" resemble the eggs or empty remains of some minute insect, for which they are frequently mistaken.

Preventive measures are alone of service in combating this disease. In selecting a site for a seed bed or nursery, it is important to ascertain that no diseased Cowberry plants are growing in the neighbourhood. Such can be readily detected when growing amongst healthy plants from the description given above.

The same rule applies when young conifers are planted in woods or other places where the Cowberry grows. If the diseased plants are not numerous, they may be removed and burned.

DESCRIPTION OF FIGURES ON PLATE.

Left-hand figure : A branch of Silver fir bearing the minute "cluster-cups" on the leaves.

Right-hand figure: Cowberry plant showing the upright branches much thickened by the fungus present in the tissues.

Left-hand lower small figure : Portion of leaf of Silver fir bearing "cluster-cups" on its lower surface.—Mag. 5 times.

II.—THE CHINESE SPECIES OF *ERIOCAULON*.

C. H. WRIGHT.

The following clavis to the Chinese species of *Eriocaulon* was drawn up as a result of the examination of the specimens employed in working out that genus for the "Index Florae Sinensis," the plan of which did not allow of its inclusion therein:

All the species, except *E. Henryanum*, occur only in the eastern half of the empire, and their number in each province is as follows:—Kwangtung, 11; Hongkong, 6; Chekiang, 5; Kiangsi, 2; Shantung, Formosa, Hupeh, Yunnan and Hainan, 1 each. Of these species, no less than 10 have been recorded from single provinces only, 3 from two, 3 from three and 1 from four. *E. Faberi*, *E. Henryanum* and *E. sinicum* are confined to China; *E. Buergerianum*, *E. Miquelianum* and *E. nipponicum* extend to Japan only; *E. australe* and *E. cinereum* to Australia only; *E. alpestre*, *E. echinulatum*, *E. luzulaefolium*, *E. setaceum*, *E. Wallichianum* and *E. Wightianum* to British India only (3 southwards to Ceylon); *E. truncatum* to British India and Malaya; *E. Sieboldianum* to British India, Malaya and Japan. The type of *E. cristatum* occurs in Northern India and Japan. No species is recorded in the enumeration of Tibetan plants in the Journal of the Linnean Society, vol. xxxv. Thirty-six of the well-ascertained Indian species do not occur in China. *E. officinale*, Koern., an imperfectly described plant, is only known as an ingredient of a Chinese medicine.

Caulis elongatus, foliis dense obtectus 1. *E. setaceum*, Linn.

Caulis brevis, folia radicalia :—

Bracteae involucentes floribus longiores :—

Flores dimeri 2. *E. nipponicum*, Maxim.

Flores trimeri :—

Bracteae involucentes acuminatae, rectae

3. *E. Miquelianum*, Koern.

Bracteae involucentes apice cuspidate longa recurva instructae 4. *E. echinulatum*, Mart.