DISTINGUISHING BETWEEN LESIONS CAUSED BY *BOTRYTIS FABAE* AND *B. CINEREA* ON FIELD BEAN LEAVES

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The most reliable means of distinguishing between *Botrytis fabae* and *B. cinerea* isolated from field bean is by conidial size.

Sardiña (1929) was the first to describe *Botrytis fabae*, and while he regarded it as a species distinct from *B. cinerea* he considered that both could infect field bean (*Vicia faba* L.) leaves (Sardiña, 1930). Confusion regarding the pathogenicity of the two species can still occur. For example Wilson (1937) attributed chocolate spot lesions on *V. faba* to *B. cinerea* Pers: Fr., and more recently Gilligan (1982), in his analysis of the spatial pattern of chocolate spot lesions on *V. faba*, assumed that all chocolate spot lesions are caused by *B. fabae*.

Mansfield & Deverall (1974) found that usually few or no symptoms, or only limited lesions, developed when *V. faba* leaves inoculated with droplets of an aqueous suspension of conidia of *B. cinerea* from a 14-day-old culture were kept at high humidity. In contrast, with the water droplet present, spreading lesions generally developed after inoculation with conidia of *B. fabae*, suggesting that aggressive lesions are rarely caused by *B. cinerea*. However, during routine plating on to agar of surface-sterilized pieces of field bean leaf lamina from various Scottish farm crops between 1975 and 1982, I frequently isolated only *B. cinerea* from some large lesions. Once established in a lesion *B. fabae* can be readily re-isolated even after several months of apparent inactivity at moderate or low humidities (Harrison, 1980*a*). These results indicate that *B. cinerea* too may cause spreading lesions.

The effect of age of conidia of *B. cinerea* on lesion induction was investigated in an experiment in which an isolate from a local bean crop was sub-cultured on different dates on to medium X plus 10% sucrose, as described by Harrison (1978) to encourage sporulation. Suspensions containing *ca* 5×10^5 conidia per ml water were prepared after 6, 9, 13 or 17 days growth on agar. Leaflets, all of a similar age, from plants of the field bean cultivar Maris Bead, grown as described previously (Harrison, 1980*b*), were each inoculated on their upper surface with six 0·01 ml droplets of spore suspension. There were five leaflets per treatment. Leaflets were placed on wet paper towels, sealed in plastic boxes and kept in darkness at 20 °C. From a total of 30 inoculation sites per treatment, there were 29, 1, 1 and 0 black spreading lesions 4 days after inoculation with spores from 6-, 9-, 13- and 17-day-old cultures respectively. These lesions were identical in appearance to those caused by *B. fabae* in various other experiments. This result demonstrates that *B. cinerea* can indeed induce the development of aggressive lesions.

On 4 July 1978, 24 leaflets bearing apparently non-spreading chocolate spot lesions were removed from a commercial crop of Maris Bead beans near Inchture, Perthshire and on 10 August 1978 a further 18 leaflets were removed from a similar crop at Invergowrie. Colour photographs were made of each leaflet and one identified lesion from each was excised, immersed in 2% Chloros (ICI Ltd, 1% w/v available chlorine) for 2 min, rinsed in autoclaved water and placed on 2% malt extract agar (MEA) in a Petri dish. The presence of *B. fabae* and *B. cinerea* was recorded after 14 days' incubation on a laboratory bench. *B. fabae* only was recorded from 19 plates, *B. cinerea* only from 12, *B. fabae* together with *B. cinerea* from six and neither from five. There were no consistent differences between the appearance of the lesions and the species recovered.

B. fabae always produces many small sclerotia on MEA, but the frequency and size of sclerotia produced by *B. cinerea* isolated from field bean leaves varies (Harrison, 1976). While most isolates produce only a few, large sclerotia, some produce many much smaller sclerotia, more characteristic of *B. fabae*. I have always found, however, that conidia of *Botrytis* isolated from field bean were clearly either those of *B. fabae*, with spores 15–24 × 11–18 μm (Sardiña, 1929), or of *B. cinerea*, with spores 9–12 × 7–10 μm (Gilman, 1957), indicating that determination of conidial size may be the most reliable way of distinguishing between these two species.

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DISTRIBUTION AND SPREAD OF *PUCCINIA HORIANA* AND ITS ABSENCE FROM AUSTRALIA AT PRESENT

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The distribution and spread of Chrysanthemum white rust (*Puccinia horiana*) is reviewed, and its absence from Australia is confirmed.

During preparation of a census of Australian rust fungi and their hosts, several references to the occurrence in Australia of white rust (*Puccinia horiana* P. Henn.) of chrysanthemum have been found. Although white rust has been intercepted in quarantine on imported chrysanthemums from Singapore in various Australian ports (specimens and information in Herb. DAR), no records of its occurrence in Australia are known. Plant pathologists in all Australian states contacted during August–September 1982 all confirmed that *P. horiana* is not present in Australia. Chrysanthemums are grown commonly in most parts of Australia and their diseases have been thoroughly investigated for many years. Of the several known rusts of *Chrysanthemum* spp., the only one recorded in Australia is *P. chrysanthemi* Roze. Australian plant quarantine regulations aim to prevent the entry of white rust. Imported chrysanthemum plants and cuttings are inspected on arrival and then grown in quarantine glasshouses where they are inspected during growth. Imported cut flowers must now come from areas free of white rust and be so certified. All are thoroughly inspected on arrival for pests and diseases and chrysanthemum cut flower consignments must be treated to render buds non-viable to prevent propagation from them.

The distribution of *P. horiana* is shown in *C.M.I. Distribution Map* No. 406, 3rd ed. (1978) where it is recorded from localized areas of Asia, Europe, South Africa, South America and New Zealand, with a note that it has been eradicated from England and Wales. More recently, an outbreak in New Jersey and Pennsylvania, U.S.A. was listed in the Additions and Corrections to the Maps (issued October 1980). A more detailed analysis of the distribution and spread of *P. horiana* has been made from the available literature and is given below.

Puccinia horiana has been known in Japan since 1895 (Hiratsuka, 1957) and also occurs in continental China (Hiratsuka, 1957; Tai, 1979; Tai & Wei, 1933), where it has been present since at least 1922 (see references listed by Tai, 1979). No report of its occurrence outside Japan and China has been found in the literature before Mumford (1960) reported its interception in quarantine in the United States in consignments of chrysanthemums from Japan and Australia (see below). In 1963, an outbreak occurred in England on plants of Japanese origin (Baker, 1967). Gorter (1979) listed *P. horiana* as a new record for South Africa, having arrived some time after 1945. It was probably present there prior to 1964 as, in that year, it was recorded for the first time in Norway (Gjaerum, 1964), Denmark (Jorgensen, 1964*a*), Finland (Talvia, 1965), Holland (Boerema & Vermeulen, 1964, cited by Baker, 1967) and Germany (Stahl, 1964*a*, *b*) on plants from South Africa. The earliest records from New