

A VEIN PATTERN OF BLACK CURRANT LEAVES ASSOCIATED WITH REVERSION DISEASE

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Abstract

A chlorotic vein pattern of black currant leaves, previously known from a single plantation in Kent, has now been found at many other localities in the county and elsewhere. In all instances investigated in detail the vein pattern was accompanied or followed by the conventional leaf abnormality of reversion disease. Evidence that vein pattern is a preliminary phase of reversion disease was obtained in graft- and mite-transmission experiments.

The virus causing reversion disease of black currants has been known for many years and is still one of the most important factors influencing the profitability of the crop. The effects of the virus in changing the appearance of the flowers and the shape of the leaves have been described previously (1, 2, 3, 4). Recently, a chlorotic pattern associated with the leaf veins (Fig. 1) has been found on plants in the early stages of reversion and is described here.

Field observations

A virus collected from a plantation near Harrietsham, Kent, was called black currant vein pattern because these symptoms were recorded after inoculating the black currant varieties Baldwin and Wellington XXX (6). Later the growth and crop of bushes propagated from stools infected with vein pattern virus were compared with healthy bushes and others which were propagated from a source infected with black currant yellows virus (6). Two years later F. A. Roach (personal communication) noted that the shape of the leaves on the vein pattern bushes resembled that of leaves showing early symptoms of infection with reversion virus. Leaf symptoms of similar intensity were again recorded the following year, but not in the control bushes or those infected with the yellows virus. This suggested that the vein pattern source had become contaminated with a virus of the reversion type. Alternatively, the vein pattern symptoms may have been a preliminary phase of an inconspicuous form of reversion disease. Further observations have shown the latter possibility to be the more likely.

The vein pattern symptom previously described from a single source is now known to be widespread and affected leaves have been found at numerous localities in Kent and elsewhere. Symptoms were rarely obvious and usually only a few affected leaves were found on a small number of bushes in plantations where reversion disease occurred. Vein pattern leaves were often deep within the bush, which probably explains why they have been overlooked in routine inspections for certification purposes.

In all instances investigated in detail, bushes that showed vein pattern symptoms also bore, or soon produced, leaves having the distorted shape typical of reversion disease. Such symptoms of reversion were usually slight and were at first restricted to a few upper leaves on a small number of shoots. Later in the season and the following year the symptoms of reversion disease became more widespread and conspicuous, whilst the vein pattern became even more difficult to find and was usually absent from completely affected bushes.

Graft transmissions

Two- and three-year-old black currants were grafted in July and August 1961 with bark-patches from bushes in different localities showing vein pattern or reversion symptoms. In 1962 all the inoculated bushes showed the sequence of symptoms seen in the field observations. Normal flowers appeared in April, followed in May by leaves with vein pattern and in June and July by leaves showing reversion symptoms of increasing severity.

The various isolates of virus differed in their effects. That from Harrietsham caused an intense vein pattern, although leaf shape was little affected, whereas an isolate from Goudhurst caused particularly conspicuous symptoms of each type, and most of the other isolates had intermediate effects.

Mite transmissions

In transmission experiments in the glasshouse in 1961 small black currant seedlings were infested with gall mites from sources that had shown vein pattern or reversion symptoms in the previous year. After four days the plants were dipped in 0.05% endrin to destroy the mites and avoid their direct effects on the foliage which could have complicated other comparable experiments (5, 7). Seedlings of each group produced conspicuous vein pattern symptoms within a month. The usual leaf symptoms of reversion could not be recognized with certainty on the various seedlings in the glasshouse and grafts were made to healthy mite-free Wellington XXX black currants growing outside. In 1962 these bushes produced vein pattern followed by reversion symptoms, whereas all the controls remained healthy.

Discussion

The original isolate which caused vein pattern had a barely detectable effect on the apparent pigmentation of flowers and on leaf shape. Consequently it was ascribed to a distinct virus for which the name black currant vein pattern was proposed. This name should be abandoned now that there is evidence that vein pattern is an early symptom of reversion disease. It seems likely that the usual symptoms of this disease are caused by a number of virus strains which differ in their effects. This may explain why some completely affected plantations bear a profitable crop, whereas others are worthless. The vein pattern symptom provides an opportunity of identifying bushes infected with reversion disease at an earlier stage than hitherto. This is unlikely to be of great practical importance in roguing plantations infected with the usual strains of reversion virus because the preliminary symptoms are so restricted and difficult to see. However, strains similar to that from Harrietsham may occur elsewhere, in which case the vein pattern symptom in recently infected plants would provide the only reliable means of identification.

REFERENCES

- (1) AMOS, J., and HATTON, R. G. (1927). Reversion of black currants. I. Symptoms and diagnosis of the disease. *J. Pomol.*, 6, 167-83.
- (2) ——— (1921). A method of identifying reversion of black currants. *Ann. Rep. Long Ashton Res. Sta. for 1920*, 66-70.
- (3) LEES, A. H. (1922). Leaf character in reverted black currants. *Ann. appl. Biol.*, 9, 49-68.
- (4) ——— (1925). Reversion disease of black currants: means of infection. *Ann. appl. Biol.*, 12, 199-210.
- (5) MASSEE, A. M. (1952). Transmission of reversion of black currants. *Rep. E. Malling Res. Sta. for 1951*, 162-5.
- (6) POSNETTE, A. F. (1952). New virus diseases of *Ribes*. *Rep. E. Malling Res. Sta. for 1951*, 133-5.
- (7) SMITH, B. D. (1962). Experiments in the transfer of the black currant gall mite (*Phytoptus ribis* Nal.) and of reversion. *Ann. Rep. Long Ashton Res. Sta. for 1961*, 170-2.

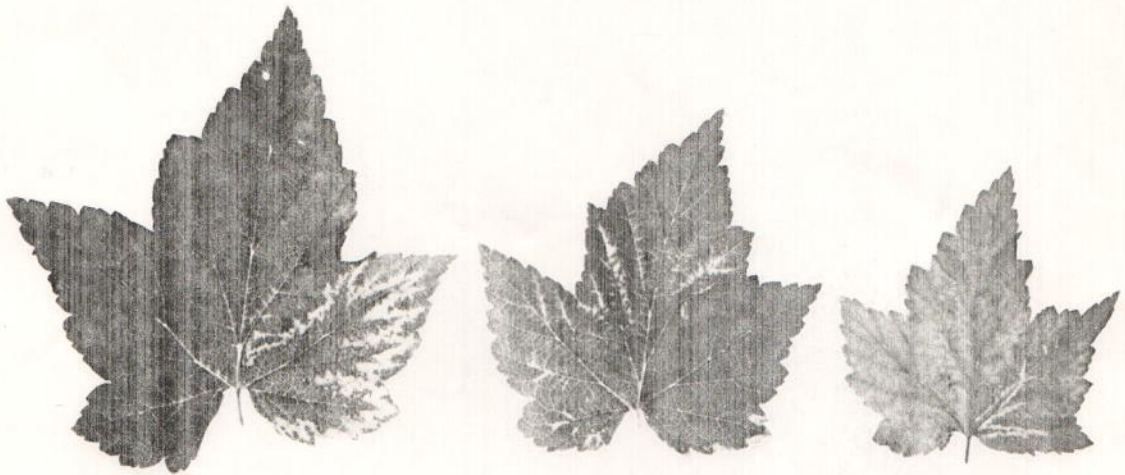


FIG. 1

Leaves of Wellington XXX black currant showing vein pattern symptoms.