Letter to the Editor

Interpretations of Gel Diffusion Tests

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The September 1972, issue of Phytopathology contains two papers that deal in part with the serological relationships of virus isolates with known viruses. Both groups of authors utilized agar gel diffusion tests.

Ford et al. (1) state that elm mosaic virus (EMV) in Iowa is "serologically identical to type EMV". They describe Iowa EMV as giving an "homologous" reaction with its antiserum and a Wisconsin EMV antiserum in adjacent, peripheral wells. "Type" or "Wisconsin" EMV antigen was not included in these tests.

Hibben & Bozarth (3) claim to have found a "close" serological relationship between tobacco ringspot virus (TRSV) and a virus "strain" from a declining ash tree. They tested the ash isolate of TRSV against its antiserum and the TRSV antiserum in adjacent, peripheral wells and observed "a single merging precipitin band".

The purpose of my letter is to draw attention to the comprehensive review article by van Regenmortel (4) and the excellent paper by Grogan et al. (2) which emphasize two essential requirements before conclusions concerning serological identity or distinguishability of viruses can be made from gel diffusion plates. First, homologous and heterologous virus antigens must be reacted simultaneously with an antiserum. Second, the antigens must be in adjacent, peripheral wells.

With these requirements in mind, we see that none of the experiments reported by Ford et al. (1) justifies use of the terms "identical" or "homologous" (see their Fig. 3). Hibben & Bozarth (3) are not justified in attaching significance to a single merging band obtained with their experimental set-up (see their Fig. 5). Hibben & Bozarth must have had the proper reactants for suitable gel diffusion tests because they state that ash isolate antiserum "reacted positively" with ash TRSV and TRSV. Nothing is said about whether the bands spurred or coalesced, if, indeed, the reactants were placed properly in the gel in relation to each other. Furthermore, use of the term "close" to describe a serological relationship is debatable. Van Regenmortel & von Wechmar (5) have argued that degrees of relationship among viruses, e.g., "close" or "distant", cannot be determined, because qualitative variations occur in antisera.

Based on the information given in the two papers under discussion, we can say only that Iowa EMV is serologically related to Wisconsin EMV and that ash TRSV is related to TRSV. Whether the isolates are serologically identical to or distinguishable from known viruses awaits further work.

LITERATURE CITED

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