Neth. J. Plant Path. 70 (1964): 180–182

SHORT COMMUNICATIONS

EFFECT OF ULTRAVIOLET IRRADIATION ON TOBACCO MOSAIC VIRUS INFECTIONS IN BEAN LEAVES[1]

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GIVEON & WILDMAN (1962) found an increased sensitivity of tobacco mosaic virus (TMV) infections to ultraviolet (UV) irradiation in leaves of *N. glutinosa* at one and a halve hour after inoculation and DIJKSTRA (1964) reported maximum sensitivity at 2–3 hours after inoculation of the same host at 20–22 °C. I confirmed this phenomenon with *N. glutinosa* and made a comparative study of the effect of UV on TMV infections in bean leaves. Detached leaves of beans (var. 'Pinto') were inoculated with purified TMV (common strain) or with TMV nucleic acid (RNA) prepared by phenol extraction. Both inocula were dissolved in 0.05 M phosphate buffer pH 7 and carborundum or Celite was used as an abrasive. Half-leaves were irradiated at different intervals after inoculation, the unirradiated halves of the same leaves being used as controls. Two UV sources were used: Mineralight Mod. R. 51 of Ultraviolet Prod. Inc. (lamp A) and Westinghouse Sterilamp 782L–30 (lamp B). The leaves were incubated at 20–22 °C under continuous light, either in Petri dishes, or in roasting pans according to RAPPAPORT & WU (1962). The local lesions were counted after four days on beans and three days on *N. glutinosa*.

The effect of irradiation of 'Pinto' bean leaves with lamp A at different times after TMV and RNA inoculation is shown in Fig. 1; the effect of irradiation of leaves ot bean and *N. glutinosa* with lamp B appears in Fig. 2. In all conditions, the sensitivity of the TMV infected centers in bean leaves increased after inoculation to a maximum at one hour, and then decreased. With identical inoculum, irradiation source, and temperature, the maximum inhibition and subsequent rise in resistance occurred one hour later in *N. glutinosa* than in bean leaves, although the effect at zero time was similar for both hosts.

Previous experiments using inhibition of TMV infections by acid treatment of the leaves (SEMAL, 1963) also showed larger differences in this respect between TMV and RNA centers in *N. glutinosa* than in bean leaves, suggesting a more rapid formation of active RNA in the latter host. DIJKSTRA (1964) proposed an alternative explanation of these results and suggested the possibility that "the infected susceptible sites of TMV in French bean were less affected by the acid treatment than were those in *N. glutinosa*". However, this view is not supported by other results: 1. the acid treatment has an almost similar effect on both hosts when applied immediately before TMV inoculation and 2. a longer time is needed with bean than with *N. glutinosa* for restoration of the leaf capacity after acid treatment (SEMAL, 1962, 1963). Although the mechanism involved is not known, the results obtained suggest that some early step of TMV infection previous to further virus development proceeds more rapidly in 'Pinto' bean leaves than in *N. glutinosa* at 20–22 °C.

[1] Accepted for publication 9 August, 1964.

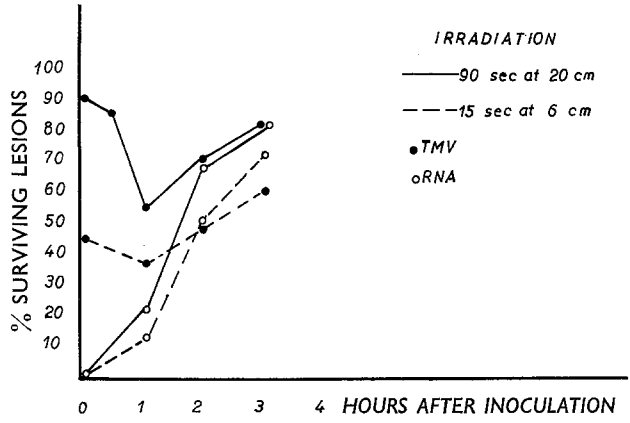

FIG. 1. Effect of ultraviolet irradiation of 'Pinto' bean leaves inoculated with tobacco mosaic virus or RNA; irradiation by lamp A at different times after inoculation.
The points plotted show the number of lesions formed on the irradiated half-leaves expressed as a percentage of those on the untreated opposite halves.

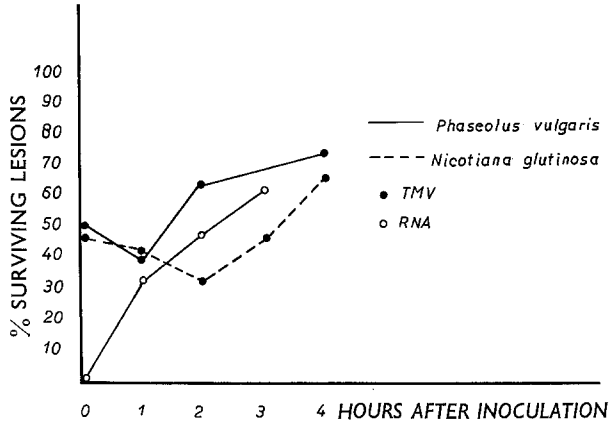

FIG. 2. Effect of ultraviolet irradiation of 'Pinto' bean leaves and *N. glutinosa* leaves inoculated with tobacco mosaic virus or RNA; irradiation by lamp B (3 minutes at 25 cm) at different times after inoculation.
The points plotted show the number of lesions formed on the irradiated half-leaves expressed as a percentage of those on the untreated opposite halves.

ACKNOWLEDGMENTS

I am very grateful to Prof. A. F. Ross, Cornell University, and to Prof. S. G. WILDMAN, University of California at Los Angeles, U.S.A., for their kind hospitality during this investigation.

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