

Serological Identity of Muskmelon Yellow Stunt and Zucchini Yellow Mosaic Viruses

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ABSTRACT

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Two potyviruses infecting cucurbits, first isolated in southern France and northern Italy and described as muskmelon yellow stunt virus and zucchini yellow mosaic virus, respectively, have been compared serologically and found indistinguishable. In view of other similarities in host range, symptoms, aphid transmission, and particle morphology, the two are considered to be a single virus for which we propose retaining the name zucchini yellow mosaic virus.

Muskmelon yellow stunt virus (MYSV) (1) and zucchini yellow mosaic virus (ZYMV) (2) are names given to two independently studied potyviruses infecting cucurbits in southern France and northern Italy, respectively. Both viruses cause similar severe diseases, inducing stunting, yellow mosaic, and distortion of leaves and malformation of fruit in muskmelon and zucchini. MYSV and ZYMV also have similar host ranges and particle morphology. Both are nonpersistently transmissible by *Myzus persicae* and both are serologically related to some isolates of watermelon mosaic virus-2 (1,2).

Because of these similarities, the two viruses have been compared serologically using both the SDS-agar immunodiffusion test according to the method of Purcifull and Batchelor (4) and the slide precipitin test. Viruses and antisera used in this comparison were those described earlier (1,2).

In SDS-agar immunodiffusion, crude

sap from zucchini infected with either MYSV and ZYMV was tested against MYSV and ZYMV antisera. All sera reacted with both viruses, giving precipitation lines that fused without spurs (Fig. 1), indicating that the viruses were related.

For the slide precipitin test, both viruses were partially purified as described previously (2). Sera against both viruses were cross-absorbed with pelleted partially purified virus as

Table 1. Homologous and heterologous titers of MYSV and ZYMV antisera before and after cross-absorption in slide precipitin tests

| Antisera | Titers to: | |
|--------------------------|--------------------|-------|
| | MYSV E-15 | ZYMV |
| MYSV E-15 I ^a | 4,096 ^b | 4,096 |
| MYSV E-15 II | 4,096 | 4,096 |
| ZYMV I | 1,024 | 1,024 |
| ZYMV II | 1,024 | 1,024 |

| | | |
|--------------------------------------|---|---|
| MYSV E-15 I absorbed with ZYMV | 0 | 0 |
| ZYMV I absorbed with MYSV E-15 | 0 | 0 |

^aI and II indicate sera obtained from different rabbits.

^bReciprocal, average of three tests.

described by Luisoni and Conti (3); the absorbed and unabsorbed sera were then titrated against homologous and heterologous viruses (Table 1). The unabsorbed sera gave identical titers with both homologous and heterologous antigens; after cross-absorption, reactions were no longer detected with either virus. These results indicated that MYSV and ZYMV were serologically indistinguishable.

Two pathotypes of MYSV have been described according to whether or not they induce rapid wilting and death in certain melon cultivars (1). The MYSV used in the serological tests described earlier (isolate E-15) was a nonwilting

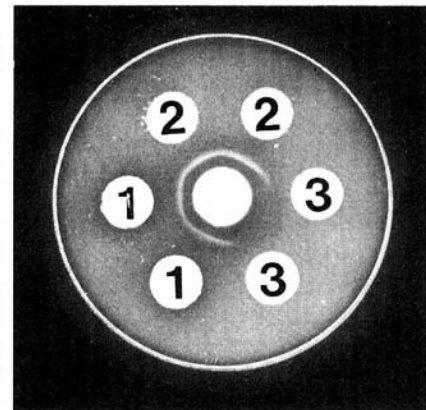


Fig. 1. Serological reactions of MYSV and ZYMV with antiserum to MYSV in an SDS-agar immunodiffusion test. Central well = undiluted serum to MYSV E-15 II, 1 = sap from ZYMV-infected zucchini, 2 = sap from MYSV E-15 infected zucchini, and 3 = sap from healthy zucchini. With sera to ZYMV, the reaction was identical.

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pathotype. In addition, we also examined isolate E-9, a wilting pathotype. In an SDS-agar immunodiffusion test with sera to MYSV E-15 and to ZYMV, MYSV E-9 gave precipitin lines that fused without forming spurs with those produced by MYSV E-15 and ZYMV. In the slide precipitin test, MYSV E-9 reacted with all the antisera to their homologous titers or one step below, indicating the close serological relationship of this isolate with both MYSV E-15 and ZYMV.

The serological identity of MYSV E-15 and ZYMV, added to similarities in all other characters examined, allows us to consider the two as a single virus. We propose retaining the name zucchini

yellow mosaic virus for reasons of priority.

Using sera to MYSV or ZYMV, ZYMV has been identified in several Mediterranean countries besides France and Italy, including Spain (H. Lecoq, *unpublished*), Israel (S. Cohen, *personal communication*), and Morocco (B. Hafidi and B. E. L. Lockhart, *personal communication*). It also causes a severe disease of squash in Germany (D. Lesemann and H. J. Vetten, *personal communication*) and in the northeastern United States (R. Provvidenti, *personal communication*). Because of its wide geographical distribution and the severity of the disease caused, ZYMV may become a major threat to cucurbit crops,

and plant protection authorities should be aware of this possibility.

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