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Research Article

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Determination of radish (*Raphanus sativus* L.) plants reactions to Turnip mosaic virus

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Abstract: In Brassica plants Turnip mosaic virus (TuMV; genus Potyvirus) is one of the most destructive viruses. Objective of the present study was to determine the reactions to TuMV of radish (*Raphanus sativus*) plants. A study was conducted in greenhouse at Faculty of Agriculture, the University of Ondokuz Mayis. The saps obtained by grinding TuMV-infected leaves in 0.01 M phosphate buffer (pH: 7.0) were mechanically inoculated to radish plants using carborundum powder as abrasive. Observations were recorded according to the disease rating scale (0-9) throughout sixty days of each experiment. The results of study showed that the incidence of virus in radish crop was 73.3%. Radish plants showed systemic symptoms developed at three weeks post inoculation (wpi). For eight weeks, the average weekly scales were 0, 0.5, 1.6, 3.0, 3.4, 3.6, 4.0 and 4.9, respectively. In radish plants the virus infections were detected using double-antibody sandwich enzyme-linked immunosorbent assay (DAS-ELISA).

Keywords: Radish, reaction, virus, TuMV

1. Introduction

Turnip mosaic virus (TuMV) is one of the most widespread viral agents affecting species of the Brassicaceae family. It affects cultivated Brassica species worldwide [1]. TuMV causes a variety of leaf symptoms including mottles, mosaics, and black necrotic ring spots. Symptom variation mainly depends on the virulence of the virus and on the susceptibility or resistance of the host [2].

The objective of this study was to assess the reactions to TuMV of the radish cultivars from Turkey. Infection time and the severity of symptoms were also evaluated in radish plants.

2. Materials and Methods

TuMV was isolated from cabbage and was maintained in radish plants. The presence of the virus was confirmed by DAS-ELISA in propagation hosts.

Seeds of cultivars commonly used in radish -growing were sown on plastic pots with commercial peat and radish plants were grown in a plant growth room at 24-26°C. Twenty seedlings, using 0.01 M potassium phosphate buffer (pH 7.0) [3], were mechanically inoculated with TuMV (Figure 1).

Figure 1. *Mechanical inoculation of TuMV using infected leaf tissues.*

For eight weeks after inoculation (wai), plants were inspected weekly for symptoms. Samples from inoculated and tip leaves were tested by DAS-ELISA (Figure 2). The symptoms on the plants were assessed using the following disease rating scale (0-9) as by [4-5].

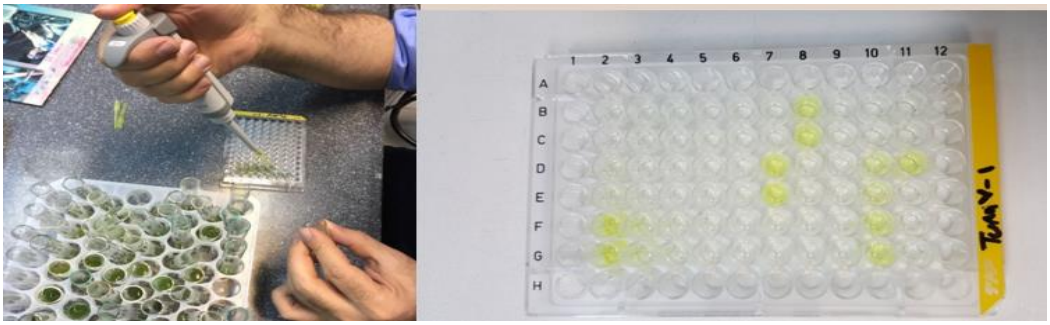

Figure 2. *Detection of TuMV by double-antibody sandwich enzyme-linked immunosorbent assay.*

3. Results & Discussion

Symptoms of infection by TuMV first appeared on radish plants within 15 days after inoculation. The majority of plants was systemically infected with TuMV and showed the typical local lesions and mosa¬ic symptoms ranging from mild to severe in intensity, corresponding to those observed by other authors [6-7] (Figure 3).

Figure 3. *Symptoms on radish plants inoculated with the TuMV*

The results of study showed that the incidence of virus in radish crop was 73.3%. Radish plants showed systemic symptoms (mosaic, mottle) developed at 3 weeks post inoculation (wpi). For eight weeks, the average weekly scales were 0, 0.5, 1.6, 3.0, 3.4, 3.6, 4.0 and 4.9, respectively. The virus infections were detected in radish plants using double-antibody sandwich enzyme-linked immunosorbent assay (DAS-ELISA) method.
TuMV is one of the economically most important pathogens in Brassica vegetables. Establishment of resistance to TuMV in white cabbage is an effective way to control this disease [8].

4. Conclusion

TuMV is one of the most common viruses in brassica crops. The objective of this work was to evaluate radish plants for their reaction to TuMV. This study was carried out in greenhouse conditions at the Experimental field of Faculty of Agriculture, Ondokuz Mayis University in order to determine the effect of TuMV to radish plants. Results showed that all radish cultivars tested in the study were susceptible to TuMV.

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