

# Quantification of Barley Yellow Dwarf Virus Strains in Tolerant and Susceptible Sister Oat Lines by TAS-ELISA and Dot-Blot Hybridization

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## ABSTRACT

*Quantification of barley yellow dwarf viruses in tolerant and susceptible sister oat lines by TAS-ELISA and dot blot hybridization.*

To investigate the mechanisms of tolerance of oats to infection by barley yellow dwarf virus (BYDV), two pairs of sister oat lines previously categorized as tolerant (T) and susceptible (S) to BYDV-PAV [(65y2147-2 (T1) and 65y 1 103-1 (S 1); 65y2115-4 (T2) and 65y2137-2 (S2)] were infected with two BYDV strains (BYDV-PAV-IL and BYDV-RPV-NY). Virions and RNAs were quantified by triple antibody sandwich enzyme-linked immunosorbent assay (TAS-ELISA) and by dot blot hybridization, respectively. Titers of BYDV-PAV-IL virions and RNA in shoots and roots of tolerant lines generally were equivalent to or higher than their titers in susceptible sister oat lines from 2 to 15 days after inoculation. Thus, there was no indication of inhibition of replication or movement of BYDV-PAV-IL in tolerant lines during the acute phase of BYD. Titers of BYDV-RPV-NY and RNA in shoots of BYDV-PAV-tolerant lines also were equivalent to or higher than titers in the shoots of susceptible oat lines from 3 to 21 days after inoculation. However, titers of BYDV-PPV-NY and RNA in roots of BYDV-PAV-tolerant oat lines generally were equivalent to or lower than those in susceptible sister oat lines on sampling dates more than 2 weeks after inoculation. Our results indicate that replication and/or movement of BYDV-RPV-NY but not of BYDV-PAV-IL is affected in the roots of oat lines previously termed tolerant to BYDV-PAV infection, therefore these lines possess some resistance to BYDV-RPV-NY. The mechanism of tolerance to BYDV-PAV was not apparent during the acute phase of the disease.

**Keywords:** monoclonal antibody, cDNA clone, resistance, titer.

## INTRODUCTION

**B**arley yellow dwarf virus (BYDV) infects a wide variety of gramineous hosts worldwide, including barley, oats, wheat, rye, and many domestic and wild grasses (Burnett,

1984). BYD is one of the most difficult diseases of cereals to investigate because of complex biological interactions among the host plants, the virus strains, and the aphid vectors. Each of these biological entities is in turn affected by variation in the