

Hordeivirus Isolation and RNA Extraction

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1. Introduction

The hordeivirus group of RNA viruses contains three members: barley stripe mosaic virus (BSMV), poa semilatifolius virus (PSLV), and lychnis ringspot virus (LRSV), with anthoxanthum latent bleaching virus (ALBV) considered to be a possible fourth member (*1*). Hordeiviruses have a diverse host range; BSMV, PSLV, and ALBV primarily infect members of the gramineae, and LRSV is known to infect several members of the dicots. As yet, no vectors have been identified that are capable of transmitting hordeiviruses. BSMV and LRSV are transmitted through seed and pollen, with the efficiency being dependent on many factors, including the virus strain, the host plant, and environmental factors. However, to date, PSLV and ALBV have not been shown to be seed-transmitted.

Hordeiviruses are tripartite viruses containing a positive-sense single-stranded RNA genome. Each genome is encapsidated within a rod-shaped (100–160 nm in length) particle that is comprised of a single-capsid protein species (**Fig. 1**). Extensive studies have been performed on the type member of the group, BSMV, and therefore we will focus on this member throughout this chapter.

The three genomes of BSMV are designated α , β , and γ . The α and β genomes are 3.8 and 3.3 kb in size, respectively, but the γ genome differs in size depending on the strain; for example, the ND 18 strain is 2.8 kb, and the type strain is 3.2 kb in size. The complete nucleotide sequences of the α , β , and γ genomes of the type strain of BSMV have been known for several years (*2–4*). The availability of infectious transcripts has permitted mutational analyses and dissection of the viral genome, to further our understanding of the BSMV infection process.