

Distribution of Soybean Viruses in Ontario

Purpose:

Soybean viruses, especially Bean Pod Mottle Virus (BPMV) and Soybean Mosaic Virus (SMV) have caused significant losses to producers and the soybean industry in North America by reducing seed weight and quality. Food grade soybeans are most affected, due to seed coat blemishing or discolourization.

In Ontario, soybean viruses often go undetected or are misdiagnosed for other causes. The cost and time associated with submitting samples for laboratory analysis also limits producer and industry participation. A soybean virus distribution survey was initiated by AAFC and OMAFRA to increase awareness amongst producers and the soybean industry of the extent of virus infection in Ontario.

Methods:

All soybean producing regions of Ontario were sampled for Soybean Mosaic Virus (SMV), Bean Pod Mottle Virus (BPMV), Tobacco Ringspot Virus (TRSV) and Alfalfa Mosaic Virus (AMV) in 2002 and 2003. A composite sample of young leaf tissue was obtained from 35 plants in each field. Over four hundred field sites were processed and virus testing was conducted through ELISA.

Results:

1. **Previous Surveys:** An initial survey in 2001 detected BPMV for the first time in Ontario and Canada. A follow-up survey found that soybean virus levels increased in 2002 (Table 1).
2. **2003 Survey:** Of the over 300 commercial fields tested, 17 were found infected with AMV, 16 with BPMV, 15 with SMV and 19 with TRSV. The number of commercial fields infected were higher than the previous year with the exception of BPMV. However 16 commercial fields that tested negative for BPMV were resampled a month later due to the high incidence of insects, especially bean leaf beetles, and 11 of these fields were found positive (69% increase) for BPMV. This suggests that the time of sampling is very important and could impact future management strategies.

Table 1- Virus Survey Results for 2002 and 2003

Virus	Number of Positive Fields	
	2002	2003
TRSV	16	19
SMV	13	15
BPMV	20	16
AMV	15	17

Summary:

Ontario Soybean fields were monitored for the presence and spread of the following soybean viruses: Alpha Mosaic Virus (AMV), Bean Pod Mottle Virus (BPMV), Soybean Mosaic Virus (SMV), and Tobacco Ringspot Virus (TRSV). All these viruses were found to be present in Ontario. From the surveys conducted to date the relative frequencies of these viruses are increasing in commercial fields. Possible explanations for this

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increase include seed-borne infection and the increase in insect vectors such as the soybean aphid and bean leaf beetle. These viruses are dependent on insects vectoring for movement and infection of the plant.

In addition to determining the distribution and frequency of these viruses, the survey increased awareness amongst producers, ag-business and soybean breeders concerning the significance of these viruses.

Next Steps:

Future virus surveys will need to be conducted to assess the spread and extent of soybean viruses in Ontario. Continued education on soybean viruses and the spread of these viruses will be important to minimize their impact to the Ontario soybean industry.

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Location of Project Final Report:

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