



Bean Agronomy Network~ Partnership in Industry

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Determining the Cause of Early Yellowing Syndrome on Dry Beans in Alberta

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Early Yellowing Syndrome (EYS) is a disease of unknown causation that has affected dry bean fields in southern Alberta since at least 2001. It was first reported in 2001 and was widespread in that year. It occurred only sporadically in 2002 and 2003. EYS shows up unpredictably in bean crops that are nearing maturity. Affected bean plants often occur in patches and typically exhibit yellowing on the lower leaves at early pod fill or soon afterwards. Initial symptoms look somewhat like drought stress, although soil moisture may seem adequate. Patches quickly expand and can cover an entire field in a week or less. Although bottom leaves are usually the first affected, the yellowing can quickly move up the plant, leaving only the youngest leaves green. Leaves seem to be affected on their margins first, with the yellowing moving quickly inwards. Finally, they senesce and turn a light brown color. Fields affected by EYS may appear to be ripening normally; however, upon close inspection, pods may be still green and seed undeveloped. The oldest pods may continue to mature, although seed size will be reduced. Immature pods may be sacrificed by the plant and drop to the ground.

EYS could be an infectious or non-infectious disease, or a combination of the two. Preliminary efforts by Alberta Agriculture and Agriculture Canada scientists to identify a specific cause have been inconclusive. For example, attempts to isolate bacterial and fungal pathogens from roots, stems and leaves of affected plants have not produced consistent results. Likewise, soil and plant tissue tests from affected and unaffected areas of bean fields have failed to pinpoint the cause of EYS. Further work is needed to achieve a conclusive diagnosis.

EYS will be the subject of a comprehensive research study led by Alberta Agriculture and involving various industry partners. This study will have four key objectives:

- To assess the distribution and economic impact of EYS in commercial dry bean fields in southern Alberta in 2004.
- To determine the role of biological (bacteria, fungi, viruses) and environmental (soil, water, temperature, nutrition, production practices) factors as possible causes of EYS.
- To identify crop production and crop protection practices that may help to prevent or alleviate the adverse effects of EYS in bean crops.
- To use the information generated in this study to help producers prevent or reduce the negative impact of EYS on their beans crops.

Growers who observed EYS in their bean in 2001-03 will be contacted and interviewed about the nature and extent of the problem. Soil and tissue test reports, photographs, diagnostic assays, and anecdotal comments will be collected. Bean growers, fieldmen and industry agronomists will be asked to inform Dr. Ron Howard, CDC South, Brooks (403-362-1328; ron.howard@gov.ab.ca) of any suspected cases of EYS. A team of specialists will visit these affected fields to assess crop health, growing conditions and the extent and nature of the problem. Growers will be interviewed about their cropping practices. Soil and plant samples will be taken from healthy and diseased areas of EYS-affected bean fields. Results will be analyzed for key factors that could be implicated as potential causes of EYS.