TRIED AND TRUE ASSESSMENT OF SNAP BEAN AND PEA ROOT ROT POTENTIAL

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Wisconsin continues to rank first in the production of snap beans and the acreage planted to green peas comes in third in the nation. Yields, however, continue to be variable and depend, in large measure, on paying close attention to rotations, following crops where fumigation is used, close observation of root health and careful irrigation to avoid the ravages of white mold. The five year (1998-2002) yield average for snap beans was 3.79 ton/acre while peas averaged 1.86 tons/acre. We can all look at exceptional snap bean fields yielding close to 5 tons/acre and pea fields running 3 tons or more, but we can also recall fields where the grower is lucky to recover the cost of the seed. Root rot is one of the key limiting factors determining the yield of both crops. Years ago I heard the story about a snap bean producer who was warned by the world famous plant pathologist, Dr. J.C. Walker, that he needed to follow a minimum of a three-year rotation to avoid root rot and that the grower would have no future if he grew snap beans as a monoculture in the central sands area of Wisconsin. The grower promptly responded that he already followed a three year rotation, growing for Company A the first year, Company B during the second year and completing the rotation with Company C during the third year. I can only imagine Dr. Walker's response and wish that I'd been there in person. The story still gets a chuckle at grower meetings, but the message is still just as pertinent. Without careful attention to rotation and the root rot that accompanies a lack of rotation, disease losses can be costly. Root rot is still prevalent today, especially in seasons with wet soils during the early portion of the growing season and particularly in fields with too short a rotation between susceptible crops. The early portion of the past growing season provided the cool wet conditions that favor root rot on peas and the excessive rainfall of May and June provided just the right conditions favoring bean root rot on the early planted fields. Subsequent stands of both crops were often spotty and plant roots were commonly decayed. As we moved into July, pea fields turned yellow before harvest, maturity was spotty within fields and yields were highly variable. The saving grace for many growers was the cooler than normal temperatures that helped to reduce potential losses and the number of passed fields.

Back in the late 50's, UW researcher Dr. Don Hagedorn, developed a simple test for determining the potential for common root rot development in pea fields. Details of the soil assay include the collection of soil by processor fieldmen. Soil samples consist of at

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least 5 quarts of soil collected in a random pattern from each designated field. Samples are then transported in late fall to the UW-Madison for evaluation. Each sample is thoroughly mixed and used to fill three earthenware pots. The pots are then planted with a root rot susceptible pea cultivar, watered to maintain a moderate moisture level during germination and emergence and kept in a greenhouse at 75ºF. When plants reach the two leaf stage, the soil is thoroughly watered and kept at or near saturation to encourage root rot development. For comparison purposes, additional pots are filled with soil from a field heavily infested with the root rot pathogen. Filled pots are then planted and watered the same as the pots filled with the test soils. About 4-5 weeks after planting, when the check plants in the infested soil begin to die, each plant in every pot is carefully evaluated for symptoms of root rot based on a scale of 0 (healthy) to 4 (severe symptoms or plant death). When all the plants are rated, a Disease Index is calculated on a 0 to 100 scale for each soil sample. Samples with a low Disease Index of 0 to 50 are considered safe for planting while samples with an index of 70 or higher are considered dangerous for planting. The safety of the soils with an index of 51-69 is considered questionable, but in years conducive to root rot, it's likely that yield losses will occur in the questionable fields.

A similar procedure was subsequently developed for assessment of snap bean root rot and this test has been in use since the early 80's. Samples with a Disease Index of 0 to 40 are considered safe for planting and fields with an index of 50 or above are viewed as high risk fields where root rot is likely to appear at economically damaging levels. An index of 41-49 is considered a moderate risk and fields with this index range may suffer losses in seasons when environmental conditions are highly favorable for root rot development. While some snap bean processors have observed fewer losses to root rot when they plant in a rotation with potato where the field is fumigated with metam sodium the fall before the potato production year, there is still a benefit in using the root rot assay to help insure consistency in snap bean production.

Over the past decades of use, these tests helped processors and growers to avoid fields where the risk of root rot was judged unacceptable. While the value of the tests to the Midwest vegetable industry is poorly documented, it's likely that the tests have collectively saved millions of dollars related to improved yields crop stands and processing quality. Just a few short years ago, in an era when there were still over 25 food processors in our state, submission of soil samples was common. We routinely received over 350 soil samples each year and in addition some processors conducted their own testing program in private greenhouses. In recent years the number of samples coming to the university has declined to the point where I wonder whether the current generation of growers and processor field personnel are familiar with the value of the test for avoiding risky fields. The root rot assays are still available at the UW – Madison for a cost of $50 per soil sample. Soil samples collected in the Fall before the snow begins to fly and the soil freezes can be tested during the winter months in heated greenhouses. Results are then available prior to the contracting period so that those fields with the highest risk of root rot can be avoided until such time as the disease indices return to a safe level. Samples can also be processed in the spring as soon as fields thaw. Since it takes us over a month to process each sample and calculate the Disease Index, there may

not be sufficient lead time for processors to make contracting decisions on these fields. Thus we strongly suggest collecting samples in late summer and early fall so that the information gained through sampling can be effectively used in subsequent planting decisions.

Given the amount of root rot present in many pea fields this past summer that resulted in passed acreage and reduced yield at harvest and the amount of root rot showing up in some snap bean fields, it may be time to take a hard look at resuming the use of the root rot test. For more information, check out "Analysis of the snap bean root rot potential of Wisconsin fields" at http://cecommerce.uwex.edu/pdfs/A3242.PDF.