What’s Wrong With Our Tomato and Pepper Seeds?

“SEED BORNE BACTERIAL DISEASES”

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I recently had an opportunity to see first hand the production of hybrid tomato and pepper seed in Thailand. I was able to observe over 100 individual Thai fields. I watched as the flowers were emasculated, then pollinated, observed their cultural practices, began to understand their unique insect and plant disease problems, saw how the fruit was harvested, fermented, acid treated and packaged. I saw it all, but I do not profess for a minute this makes me completely knowledgeable about the seed industry. Many have spent a lifetime working and agonizing over the production problems of hybrid seed. I do, however, have impressions and have seen, as we all have, the losses in crop yield and quality of vegetables in Ontario fields as a result of bacterial diseases originating from seed.

We all are so dependent on one another. Any failure, albeit unintentional, can result in devastating crop losses for both the grower and the processor.

There is no blame and no fingers being pointed --- but a shared responsibility to do “our best.”

Thailand - A Place to Grow

Thailand is an excellent place to grow hybrid seed. In the North-east the land is flat, the labour is inexpensive and the labourers are enthusiastic. There is plenty of sunshine, days are warm and water for irrigation is available. Vegetable seed production is an off-season enterprise for these growers of rice. Those who have access to irrigation are using this resource to grow hybrid seed for the world.

Seed companies contract with local agents to manage these seed fields. An average size farm or seed field is 0.2 acres. The local agencies subcontract with hundreds of seed growers. Each grower, however, is directed by Thai company supervisors and inspectors, often seeing them 2-3 times or more per week - a well coordinated effort. The supervisors are well trained and educated. Production quotas encourage long productive hours. They are committed to the expansion of this business.

Production Problems - Theirs

There are production problems for sure. Tomato spotted wilt virus, yellow leaf curl virus, chili mottled virus, southern bacterial wilt, southern blight, fusarium crown rot and blossom end rot result in losses in yield and seed weights. Root-knot nematodes attack vegetable roots as well. These diseases, for the more part, are their problems and not ours directly - in the sense of not being of any significance in the transmission of seed borne diseases such as alternaria blight, stemphylium - grey leaf spot, cercospora - leaf mold, powdery mildew, and anthracnose all affect their potential yield. My focus and concern were the bacterial diseases such as bacterial canker, bacterial spot and bacterial speck that can be brought into Canada on the seed.

Bacterial Diseases

I saw no bacterial canker in Thailand and only recently has bacterial spot and speck been introduced. While in a small town near the Mae Kong river I was shown a “new disease” of great
concern to the Thai pepper seed production supervisor. Leaves had been sent to the university at Khon Kaen with a preliminary diagnosis of Early Blight. It was, however, bacterial spot. Its source was the male inbred introduced by the seed company and was spreading into the female lines. We went to field after field of the same seed lot - bacterial spot. Several pepper fields of a different seed lot were clean of the disease. A clear case of the introduction of a disease into Thailand. A seed company had sent “dirty inbred seeds.” I told them that nobody in Canada wanted that seed but, the seed from that field is being saved and will no doubt find its way into North America and some unsuspecting grower whose livelihood depends on his pepper yields will be faced with discing his field down due to bacterial spot.

**Seed Treatments - Tomatoes**

Bacterial diseases in tomatoes, we are told, can be controlled using either acid or chlorine seed treatments. A number of international seed companies request specific tomato varieties to be acid treated at the origin of production. Those varieties **not treated**, therefore, could very well be acting as sources of bacterial disease inoculum and thus be responsible for the distribution of serious bacterial diseases throughout our northern greenhouses.

I did see how seeds were acid treated in Thailand. A given concentration of acid is applied depending on the weight of seed-more or less. The seed was well stirred-more or less. The length of time the seed was acid treated was 10-15 minutes - more or less. If the seed weight was light or suspected of having poor germination the treatment time was shortened or eliminated. Treatment was done by each farmer. There are well over 200 farmers growing seed in Thailand.

In my opinion “this practice results in a highly variable, inconsistent treatment, giving a false sense of security to the entire industry, that the seed, even though it is declared “treated”, is free of seed borne diseases.”

No wonder we have problems with seed borne diseases.

**Recommendation**

A strong recommendation would be to centrally treat all seed in a highly sophisticated and precisely controlled fashion. Some companies do exactly that and they should be commended. Some leave seed treatment in the hands of others.

**Seed Treatment - Realities**

It is important to recognize that even if the seed is labelled as treated - one might question whether it has been treated well and uniformly enough for disease control. It may be the case that the seed was not treated long enough, the acid or chlorine content could have been degraded or diluted to an ineffective rate, or the seed package was so large that each seed was not exposed to the treatment as thoroughly as thought.

There are practical reasons why seed treatments in acid or chlorine or even hot water are shortened. The longer the seed is exposed to these highly concentrated baths the greater the risk of reduced seed germination - and we all are aware and understand all that this implies.

Seed weight and vigour also play a role in deciding whether to treat or not and for how long.

**Seed Treatment of Hybrid Seed**

A conscious decision by the seed industry must be that all inbred lines sent to seed fields are treated - long enough for disease control - even if some loss in germination results. The increased costs of seed at this stage will surely pay dividends by ensuring clean seed fields, lessening the risk of introducing many of these devastating seed borne bacterial diseases into “new lands.”

**Nothing Is Absolute**

We all appreciate that science will take us only so far - that even under the most accurate of seed treatment procedures, small amounts of disease organisms may still survive. But the industry must truly get to this stage before effective control can be achieved.
The northern greenhouse grower also has a vital role in managing seed borne diseases by isolating seed lots, physically separating tomato and pepper transplant production, ensuring optimum greenhouse ventilation and proper watering techniques.

We all need to take responsibility in the production of disease free vegetable transplants.

New technology such as is being proposed for controlling black rot on brassica seed using the Dyna-Rx seed treatment may hold the promise we are all looking for, but until then, our existing tools must be used effectively.