

Some Effects of Sugarbeet Diseases in Arizona

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There are many opposing ideas concerning the significance or even the existence of some fungal and bacterial diseases of sugarbeets in Arizona.

Diseases, by definition, have the potential under the optimum conditions to economically affect a crop. Diseases are generally specific in varying degrees as to environment and host range. Assuming these two theorems are correct, different diseases would generally be prevalent in different areas.

A common occurring disease such as powdery mildew (Erysiphe betae) was unheard of in most areas of the United States a decade ago. Today, its widespread appearance has undetermined effects on sugarbeets and an unknown economic threshold. Questions such as why or how adjacent fields have different infestation pressures are unanswered. It is even questionable as to how this disease reoccurs annually. Are the spores blown in annually with the wind as some pathologist theorize?

Less common occurring diseases can do more economic damage locally in either or both of two ways: (a) plant loss of field, (b) reduction of recoverable sugar in marketable beets.

Erwinia sp. is a bacterial disease capable of causing economic losses in several ways. First, under ideal environmental conditions, it is capable of extensive plant loss within the field. Secondly, many diseased and partially rotted beets with extremely low purity and sugar content will be harvested, transported and processed. Third, costly processing and reprocessing will result in high production of low value molasses and reduction in white sugar.

In this agronomist's opinion, the determination of purity in sugar analysis data can be and should be of primary interest to the company when total company economics is concerned.

The word "rot" in science literature tends to be an evasive term. Does it mean the portion of a beet darkened or discolored? Is it the soft, liquid portion? These two areas, depending upon organism concerned, are of different composition.

An aggregate of ten beets infested with Pythium were collected and trimmed. All healthy and questionable tissue was removed, leaving only obviously softened and marginally affected tissue. Similarly, Macrophomina (Rhizoctonia bataticola) infected beets were collected.

The beet samples were washed and repeatedly passed through a multiple beet rasp to insure a complete, and total mixing of the brei.

The following yield data indicates a sharp decline in percent sugar and purity for both diseases:

Pythium aphanidermatum

	<u>% Sugar</u>	<u>Nitrate</u>	<u>Purity</u>
Control - 100% healthy	7.1	4.0	67.7
Rot - 100% infested	3.0	4.0	16.3

Planted 2/20 to 3/20. Sampled 9/1. Harvested 9/29/76.

Macrophomina

	<u>% Sugar</u>	<u>Nitrate</u>	<u>Purity</u>
Control - 100% healthy	10.5	4.0	80.3
Rot - 100% infested	3.0	4.0	31.3

Planted 11/12. Sampled 7/1. Harvested 7/27/76.

Assuming the rotting organism is of the type which would leave harvestable portions of beets, economic losses would not end in the field. All of the trimmed beets used in this experiment would have been harvested and transported to the factory.

Yield data from beets known to be 100 percent rotted from a disease, can be used to estimate rot losses within a field through interpolation. This should aid in determining the urgency to harvest diseased fields, and approximate losses due to soft rot organisms in specific fields.

The factory prefers a minimum of 78 to 80 percent purity and 10 to 12 percent sugar for efficient sucrose production.

Losses from these two diseases, Erwinia, Sclerotium, Rhizopus arrhizus, and others can be many fold. Losses in the field could be the cheapest for the company. Partial rots taken into the factory are bought and tend to be excessively expensive to process.

During the 1976 Chandler campaign, the average daily production of molasses was 165 tons per day. Between July 1, and August 3, this average increased to 285 tons per day with a high of 395 tons for one day. The selling price at the time for molasses was \$56.00 per ton, whereas sucrose was \$16.00 per cwt or \$320 per ton. Chandler has no Steffen House process capabilities. Soft rot organisms were very prevalent in most local areas during this time.

Many highly infested local fields are again planted back with beets this year.