# Physiological disorders in potato tubers

### By André Murray, certification official, Potato Certification Service

Secondary growth and glassiness are common physiological disorders in potato tubers that can significantly affect their quality and marketability. Secondary growth occurs when tubers develop irregular shapes and additional small tubers due to fluctuating soil moisture or nutrient availability.

Glassiness, also known as glassy end, is characterised by translucent, water-soaked tissues within the tuber, often leading to a loss in texture and quality. Glassiness is expressed in the appearance of translucent areas inside the flesh. These are caused by the partial or total disappearance of the starch grains in the tissues concerned. In the case of seed potatoes, severely affected tubers germinate badly and can result in stunted plants.

## Conductive conditions

During a routine tuber inspection a few years ago on a potato farm in the Eastern Free State, I encountered seed potatoes exhibiting pronounced glassy symptoms. Intrigued by these observations, I did research to understand the underlying causes. It became evident that both environmental conditions and improper harvesting and storage practices played crucial roles in the development of these disorders.

Environmental factors play a critical role in the onset of glassiness in potato tubers. High soil temperatures, coupled with rapid soil moisture changes, can cause tubers to accumulate excessive water in their cells, leading to a glassy appearance (Struik and Wiersema, 1999). Poor soil aeration and compaction exacerbate this condition, further stressing the
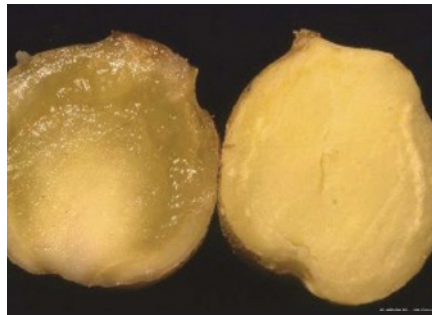


*Glassiness is expressed in the appearance of translucent areas inside the flesh. (Source: French National Research Institute for Agriculture, Food and Environment)*

plants and impeding proper tuber development (Hooker, 1981).

Harvesting conditions also significantly impact the incidence of glassiness. Tubers harvested during wet conditions or after a sudden drop in temperature are more prone to glassiness. The inspection revealed that harvesting took place shortly after heavy rains, likely contributing to the observed glassy symptoms. In addition, rapid cooling of the tubers post-harvest can cause internal cellular damage, leading to glassiness (Stevenson, 1993).

Storage conditions are equally critical in the prevention of glassiness. To prevent condensation and water accumulation, tubers should be stored under well-ventilated conditions at consistent temperatures. The farm in question stored the seed potatoes in an open-walled shed, potentially leading to daytime highs and nighttime lows as well as wind passing through the shed, which could have intensified the glassy symptoms.

## Mitigation tactics

To mitigate these issues, producers should focus on maintaining consistent soil moisture levels, avoiding harvesting during adverse
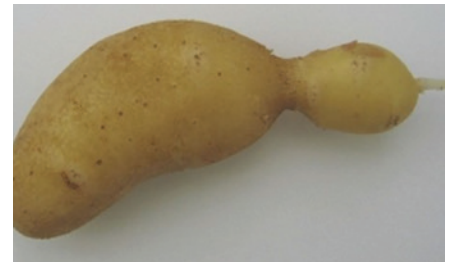


*Secondary growth occurs when tubers develop irregular shapes and additional small tubers due to fluctuating soil moisture or nutrient availability. (Source: French National Research Institute for Agriculture, Food and Environment)*

weather conditions, and ensuring proper storage conditions. Implementing these practices can significantly reduce the occurrence of secondary growth and glassiness, thereby improving the quality and marketability of potato tubers.

We closely linked the glassy symptoms observed in the seed potatoes from the Eastern Free State farm to environmental and harvesting conditions known to cause glassiness. Proper management of these conditions is essential for producing high-quality potato tubers.Ⓒ



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