

# An Investigation of the Causes of Black Speck Disease on Sugar Apple Fruits

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## Abstract

The Sugar apple (*Annona squamosa*, L.) is the most important economic fruit at Taitung County and the cultivation area is 4219 hectares occupied 78% of the Taiwan plantation, but the black speck disease on the fruits is getting severe at recent years, the symptom is black dots appearing on the fruit surface, this will greatly reduce the market price. For investigating the disorder causes, 20 sugar apple orchards infested with black speck disease and located at Taimali and Tunghe villages were selected, the surface soil and subsoil, just matured leaves and fruits were sampled from the trees with and without black speck disease for nutrient analysis.

The black speck disease fruits were identified with the anatomy and electron microscopy and found that the black dots were located under the epidermis which did not intrude the pulp tissue and the diameter was less than 1 mm. The symptom of the black speck disease was first giving the water-soaked appearance and then turned into black dots. The black dots were confirmed to be caused by physiological disorder, not by pathogenic fungi.

The investigated orchard soils with weak to strong acid and low in exchangeable Ca 270-2025 ppm and Mg 23-253 ppm could lead to Ca and Mg deficiency. Leaf N, Fe and Ca contents of black speck disease and normal fruits were 2.89%, 70.0 ppm, 2.15% and 2.84%, 61.1 ppm, 2.08%, respectively and their correlation was significant or great significant ( $r^2=0.53$ , 0.77 and 0.91). The pulp Ca contents of the normal fruits in the summer crop and winter crop were 19.2 and 22.7 mg/100g, but that of the abnormal fruits were 15.4 and 14.8 mg/100g, respectively; the skin Ca contents of that normal fruits in the summer crop and

winter crop were 33.0 and 32.4 mg/100g, but that of the abnormal fruits were 23.1 and 19.0 mg/100g, respectively, this indicated that the pulp and skin Ca contents of the normal fruits were significantly higher than that of the disorder fruits.

From the preliminary investigation, the black speck disease fruits might be caused by Ca deficiency, but further study is necessary.

**Key words:** Investigation, Sugar apples, Black speck disease.

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