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Zebra Chip Disease: Description, Impact, and Symptoms

Zebra chip (ZC), also known as "papa manchada" (stained potato) or "mancha rayada de la papa" (striped stain of potato) in Spanish, was first recorded in Mexico in 1994. In 2000, the same disease was observed in the Lower Rio Grande Valley of Texas. Since then, the disease has been infecting potatoes in all of the major potato producing areas in the state, including South Texas and the Texas High Plains regions. Zebra chip has caused a significant economic loss to the potato industry by reducing yields and the quality of potato tubers harvested.

Figure 1. Potato field exhibiting ZC damage in 2007.

Plants affected with ZC display several foliar symptoms such as marginal scorching, leaf rolling/curling (Fig 3), purplish discoloration and chlorosis (yellowing). Swollen nodes, proliferation of auxiliary buds, (Fig. 4) aerial tubers (Fig. 5) and stunted plants are other visual symptoms. There is a necrotic flecking or brown streaking of the flesh when tubers are cut open (Fig. 6). Sugar levels in the potato tubers are altered which results in caramelization fried as chips, rendering the characteristic dark stripes leading to the common name, Zebra Chip (Fig. 7). Potato chip processors reject infected potatoes due to the unacceptable dark stripes and the off-taste of the fried chips.

Figure 2. A nymph of the potato psyllid on the underside of a potato leaf (left). Close-up of an adult and nymph (right). Photo (right): D. Henne

The causal agent of Zebra chip has been associated to a bacterium named *Candidatus* Liberibacter solanacearum. The bacterium has been determined to be transmitted (vectored) by the potato (tomato) psyllid, *Bactericera cockerelli* (Fig. 2).

In Texas, growers are taking an IPM approach for control or management of the disease by scouting their fields using sticky traps or sweep nets for the potato psyllid and are targeting the potato psyllid with aggressive insecticide programs. Recommendations are to use the proper rates, timing, applications, and rotations of active ingredients to prevent possible insect resistance. Potato breeders are currently looking at pathogen, disease, or insect resistance as an alternative to insecticide use.

Prepared by Greta Schuster[1] , Sheila McBride[2] , Ronald French[3], and David Appel[4]
[1]Associate Professor, [2]Program Specialist, [3]Assistant Professor, and [4]Professor
Plant Pathology and Microbiology, Texas AgriLife Extension Service; The Texas A&M University System
June 18, 2012

Zebra Chip Disease: Symptoms

Figure 3. Leaf rolling on Potato.

Figure 4. Swollen nodes, proliferation of auxiliary buds.

Figure 5. Aerial tubers.

Figure 6. Necrotic flecking or brown streaking of the tuber tissue when cut open.

Figure 7. Classic dark stripes ("Zebra Chip") manifested when fried for potato chips.

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