Development of *A. stenosperma*, *A. batizocoi* and *A. valida*-derived advanced peanut lines with strong resistance to LLS and rust

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Overview

Peanuts are costly to grow due to their susceptibility to diseases and pests. Wild relatives, however, offer strong resistance to fungal and viral diseases and nematodes. In the Wild Peanut Lab we have developed a "Pipeline" that introduces wild species genetics into elite peanuts, introducing new strong traits, such as disease and pest resistance. In 2024, we advanced previously developed peanut lines with wild species genetics that confer resistance to Leaf Spots and Rust fungus. These lines were evaluated in multiple field trials and showed unprecedented resistance. Their genetics were analyzed. This progress sets the stage for Georgia-adapted cultivars with improved resistance, reducing costs and making peanut farming more sustainable.

Results

In 2024, we planted selected peanut lines from three families, with genetic contributions from four wild species in Midville and Tifton. These families are: the **BatSten Series**, with genetics from the wild species *A. batizocoi* and *A. stenosperma*; the **ValSten Series**, with genetics from *A. valida* and *A. stenosperma*; and the **Card Series** with genetics from *A. cardenasii*. Plantings in Tifton were early-season (April) to maximize pressure from TSWV, and late-season (June) to maximize pressure from leaf spots. Planting in Midville was at the end of April. In Midville we advanced 94 lines of the BatSten Series, 40 lines of the ValSten Series and 61 lineages of the Card Series. In replicated trials in two locations in Tifton, we closely evaluated leaf spot and TSWV resistance in 8 selected lines of the BatSten Series, 4 of the ValSten Series, and 7 of the Card Series. The combined resistance of the lines is unprecedented (**Fig 1**). We also approved for release as germplasm a peanut line, WPL-226C, with a new source of resistance to rust fungus from *A. batizocoi*.

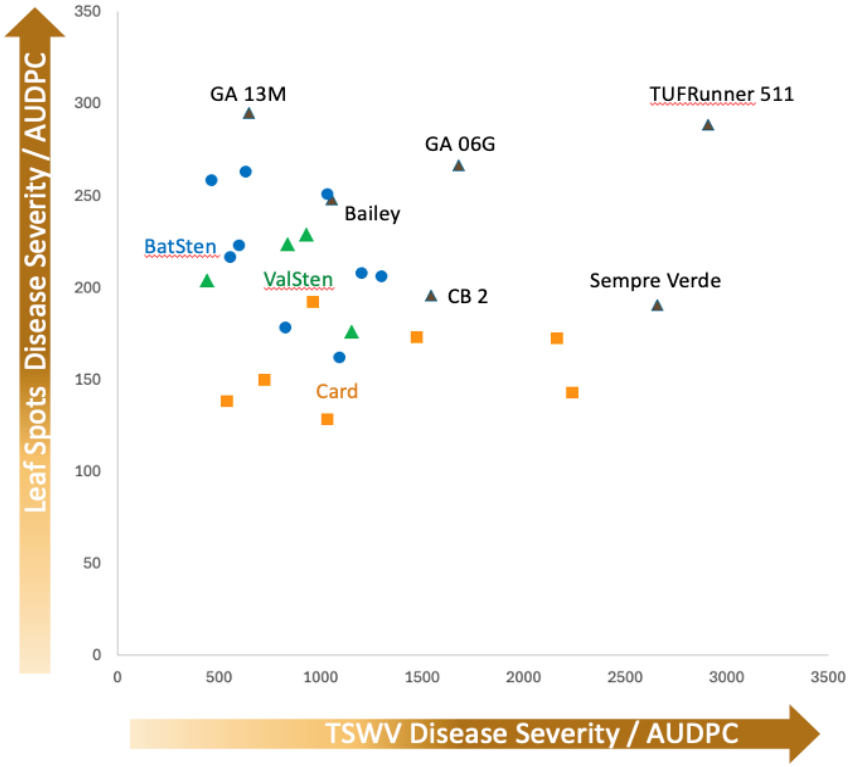

Figure 1: Summary of disease evaluations of leaf spots and TSWV in Tifton in 2024. BatSten, ValSten and Card family resistances are unprecedented, most are also nematode resistant.