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

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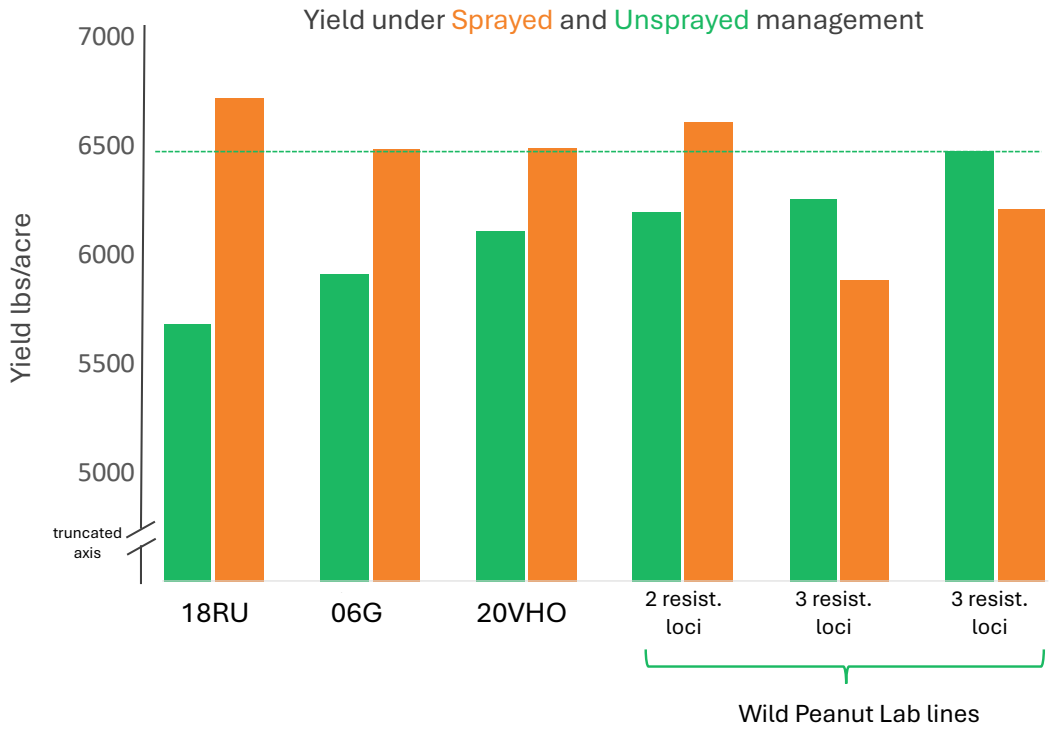
Overview

Peanut production depends heavily on chemical disease control. This reliance increases costs, management complexity, and production risk. Wild *Arachis* species, in contrast, carry strong natural resistances to fungal and viral diseases and to nematodes. In the Wild Peanut Lab, we have developed a breeding pipeline that introduces wild species genetics into elite peanut backgrounds while recovering agronomic performance. In 2025, we advanced and field-tested multiple lines carrying introgressions from *A.* cardenasii, A. *stenosperma*, *A. batizocoi* and *A. valida*. These lines were selected for resistance to early and late leaf spot, rust, and nematodes and evaluated across multiple field trials.

Results

Multiples lines were tested in multiple locations in 2025 showing unprecedented combined resistances as reported in previous years. For this one-page report, we highlight a striking result from the Midville trial. Elite cultivars showed the expected response to fungicide, with substantially higher yields under a standard spraying regime. In contrast, for the most resistant Wild Peanut Lab lines, yields were higher without fungicide. The best unsprayed wild-introgression line matching the yield of sprayed elite cultivars. This result suggests the possibility that fungicide applications, in addition to their monetary cost, may impose yield costs, potentially through leaf injury or disruption of beneficial fungi.



Field trial in which the most resistant lines yielded more when unsprayed, with the best matching the yield of sprayed elite cultivars. Bars show mean yield (lbs/acre) at Midville from three field replicates. Sprayed and unsprayed treatments were planted in adjacent field sections to minimize environmental variation. Sprayed plots received a standard protectant fungicide program; unsprayed plots received no fungicide applications. “resist. loci” indicates the number of wild resistance segments present in each line.