

# Maize Hybrid Purity Testing Services

## Quick Hybrid Purity

Immediately after harvest, hybrid purity tests can be added to sized samples completed at SoDak Labs or on samples sent directly for testing. Results can be completed in two weeks to provide genetic purity results of seed lots.

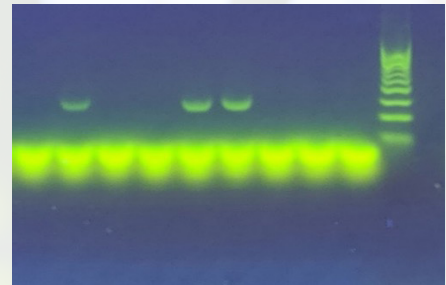
### CORN DNA FERTILE TEST (PCR FERTILE%)

A specific region in the maize mitochondrial genome has been shown to be rearranged through recombination in four different maize cytotypes: NA and NB (fertile), S and C (sterile). PCR reactions allow the amplification of DNA fragments of different sizes which are specific to each cytype. This test can be completed immediately after harvest to determine the percent fertile seeds in a seed lot. The percentage fertile in a sample is reported from a 90 seed test.

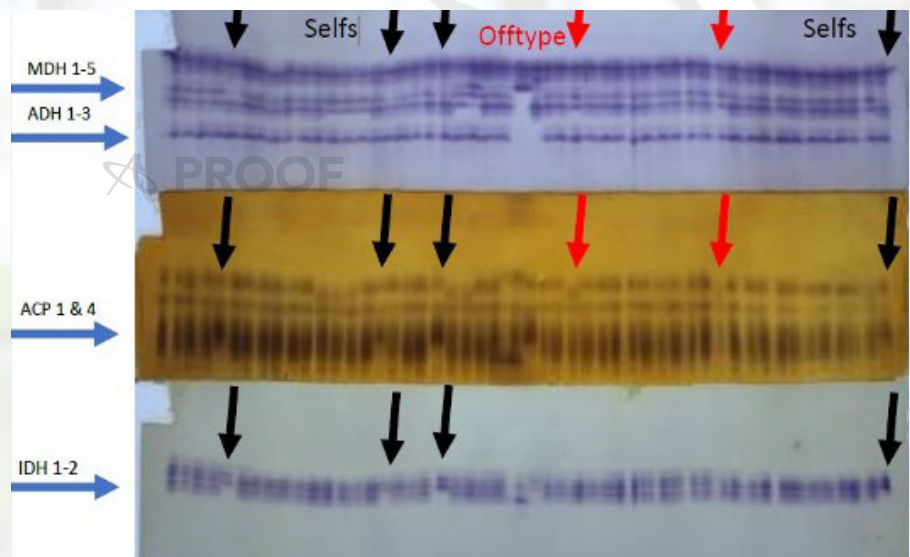
### ISOZYME ELECTROPHORESIS (EP OR EHV)

Isozymes are different versions of the same enzyme, resulting from distinct genes, yet performing the same metabolic function. These variations can be observed in differences such as amino acid composition, net charges, molecular sizes, and shapes. At SoDak Labs, we use specific activity stains to detect polymorphic isozymes after electrophoresis. Five stains, examining 16 loci, are applied, and detection relies on the precipitation of indicator dyes in areas of enzymatic activity. The total number of bands on a gel depends on factors like the number of coding genes, the organism's allelic state, protein product structures, and subcellular compartmentalization (Figure 2). Analyzing inbred parent patterns on the gel helps determine hybridity purity (EP), enabling the identification of allele segregation, selfs, offtypes, and variants. EP results can be reported on 96 or 200 seeds and is recommended to be completed on a

sized sample. Hybrid verification (EHV) can be completed on 30 seeds by confirming hybrid isozyme patterns produced by the female and male inbred isozyme patterns.



**FIGURE 1.** Agarose gel with amplified DNA from sterile (band) and fertile (no band) corn seeds. Base paid ladder on right.



**FIGURE 2.** Isozyme staining patterns used for corn hybrid purity determination.





**FIGURE 3.** Winter growout field near Ponce, Puerto Rico. Third party contractor plants, irrigates, and manages for SoDak Labs, Inc.

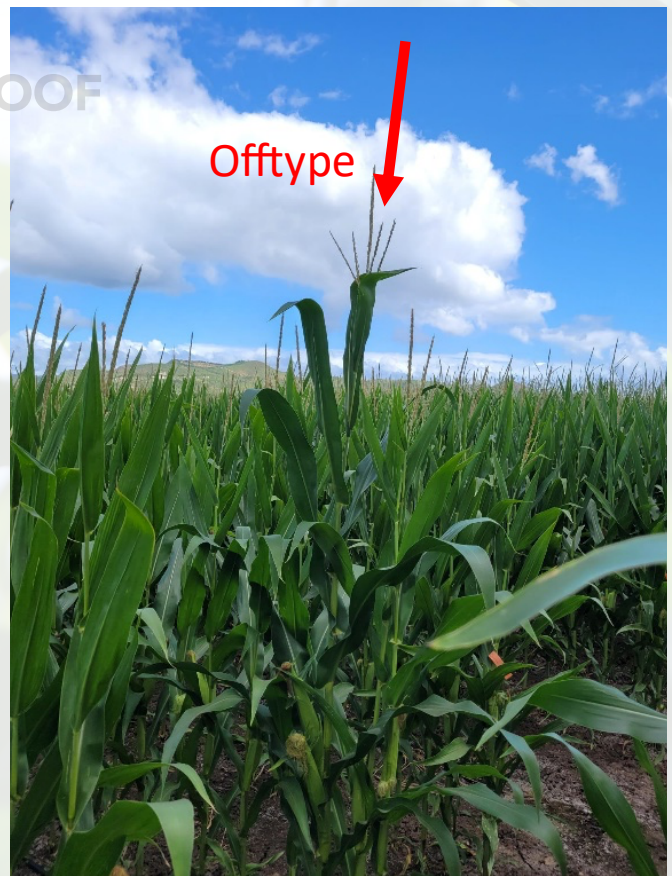
## Field Corn Purity

### GROW-OUTS IN PUERTO RICO (GO-124 OR GO-248)

150 seeds are packaged in Brookings, SD and sent to Puerto Rico for GPS precision planting. Once in Puerto Rico (Figure 3), farm staff plants the growouts in November to provide 62-70 days of growth prior to evaluation. Crops receive trickle irrigation as well as weed and insect control. SoDak staff members, Les North, John Hennenfent, and Al Bortnem evaluate crops in January/February. Hybrid purity, fertility, and inbred evaluations are available (Figure 4). By request, plant samples can be collected from a plot to evaluate selfs or offtype plants to determine single nucleotide polymorphism (SNPs) pattern compared to inbreds in the laboratory.

### WHAT IS REPORTED AND VALUE OF RESULTS

Apparent selfs and outcrosses are reported. Talls and outcrosses are described and rechecked after 5-6 additional days. Hybrids with concerns are evaluated and random outcrosses and selfs can be identified. Inbreds and sterile/fertile can also be evaluated.



**FIGURE 4.** A tall offtype observed in field growout evaluations.