

Combine Cleanout for Identity-Preserved Grain Production

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Introduction

Not all corn and soybeans are produced as bulk commodities. Some end-use customers such as processors of low-linolenic soybean oil, organic growers, and seed producers desire products with extremely low amounts or no commingled grain from other varieties or crops. Multiple sources of contamination from residual grain within on-farm equipment are possible, but the combine has the greatest number and size of cavities to harbor grain even after the unloading auger has emptied the grain tank.

Materials and Methods

Individual rotor- and cylinder-type combines alternately harvested corn and soybeans. The combine was cleaned inside and out after harvesting approximately 1,400 bushels of corn or 600 bushels of soybeans. Cleaning procedures used compressed- and vacuum-air with mechanical picks (e.g. screwdriver) used as necessary to dislodge grain and other biomaterial. Cleanout time varied from two to seven hours depending on experience, the person cleaning, and machine. Samples collected during subsequent grain harvest of the

second crop were analyzed for percentage of commingled grain from the prior crop.

Results and Discussion

One to three bushels of grain and other biomaterial were still present inside the combine after the unloading auger had run “empty” for one minute. The greatest amounts of corn and soybean material were found in the grain tank and rock trap. Intermediate amounts were found in the head or feederhouse, elevators, and at times the cylinder/rotor (soybeans), the unloading auger (soybeans), and rear axle/chopper area. The least amounts were found in the cleaning shoe and straw walkers (cylinder-type machine). Example data from replicated cleanouts of soybeans in a rotary combine are shown in Figure 1. Within an entire individual combine an average of 61% of the total residual biomaterial was whole grain with the remainder being smaller foreign material or larger residue. Following a full cleanout, commingled grain levels dropped below 0.5% after 20 bushels were harvested. Levels often dropped below 0.1% after 100 to 200 bushels were harvested, but did not always uniformly decrease below this level as small amounts randomly exited the combine. A simple flushing with subsequent crop without cleanout may not be sufficient (14 lb of oats were found inside a combine following harvest of 50 acres of wheat with no prior cleanout in a preliminary test).



Figure 1. Relative amounts of soybeans and other biomaterial collected from cleaning various areas of a rotary-type combine.