

# Mini Field Test – Massey Ferguson

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Friday August 9, 2013

Door County, WI

Luxemburg Implement

## Determining Machine Losses

1. Determine crop being cut, bushels per acre, area of the tray, header width, and discharge width.
2. When combine is harvesting a consistent amount of crop, wait for the header to pass by and then throw a tray underneath the combine, between the wheels.
3. Once the combine has passed over the tray and moved a safe distance away, collect the tray. If the straw has been windrowed, gently shake any straw that has accumulated on top of the tray to separate any seeds. Remove any large pieces of residue from the tray, making sure they do not contain seeds that have not been separated or threshed.
4. Sort the residue left on the tray using sieves A, F, W, and E.
  - a. Anything left on top of sieve A is trash.
  - b. Acceptable sized seeds will be on sieve F.
  - c. Any seeds on sieve W are considered undersized and trash.
  - d. Anything on E is considered trash.
5. Collect all seeds left on sieve F and sort out the good ones, using the USDA visual guide as a reference.
6. Count and record all good seeds.
7. Determine loss using the following equations.

$$A[ft^2] = \text{Tray Area} = \frac{30.5[in] \times 14[in]}{144[in^2]/1[ft^2]} = 2.965[ft^2]$$

$$L \left[ \frac{bu}{ac} \right] = \text{Bushel Loss per Acre}$$

$$K \left[ \frac{\text{wheat kernels}}{ft^2} \right] \left[ \frac{ac}{bu} \right] = \text{Kernels per square foot to equal 1 bushel per acre} = 20 \left[ \frac{\text{wheat kernels}}{ft^2} \right] \left[ \frac{ac}{bu} \right]$$

$$Q[kernels] = \text{Good Seeds (as found in step 6)}$$

$$W_h[ft] = \text{Header Width}$$

$$W_a[ft] = \text{Discharge Width}$$

$$V \left[ \frac{bu}{ac} \right] = \text{Yield}$$

$$L \left[ \frac{bu}{ac} \right] = \frac{\frac{Q[\text{kernels}]}{A[\text{ft}^2]} \div \frac{W_h[\text{ft}]}{W_d[\text{ft}]}}{20 \left[ \frac{\text{wheat kernels}}{\text{ft}^2} \right] \left[ \frac{ac}{bu} \right]}$$

$$\% \text{ Loss} = \frac{L \left[ \frac{bu}{ac} \right]}{\left( V \left[ \frac{bu}{ac} \right] + L \left[ \frac{bu}{ac} \right] \right)}$$

### Massey Ferguson 9795 w/ Box Concaves – 0.9% Loss

- Concaves: 3 Max Thresh, 2 OEM w/ half wires removed, 2 Round Bar
- Crop: Wheat
- Yield: 60 bu/ac
- Header Width: 30 ft
- Discharge Width: 63 in = 5.25 ft
- Good Seeds: 183
- Moisture: ~17%
- Speed: 2.5 mph

$$\begin{aligned} L \left[ \frac{bu}{ac} \right] &= \frac{\frac{Q[\text{kernels}]}{A[\text{ft}^2]} \div \frac{W_h[\text{ft}]}{W_d[\text{ft}]}}{20 \left[ \frac{\text{wheat kernels}}{\text{ft}^2} \right] \left[ \frac{ac}{bu} \right]} \\ &= \frac{\frac{183[\text{kernels}]}{2.965[\text{ft}^2]} \div \frac{30[\text{ft}]}{5.25[\text{ft}]}}{20 \left[ \frac{\text{wheat kernels}}{\text{ft}^2} \right] \left[ \frac{ac}{bu} \right]} \\ &= 0.54 \left[ \frac{bu}{ac} \right] \end{aligned}$$



$$\% \text{ Loss} = \frac{0.54 \left[ \frac{bu}{ac} \right]}{\left( 60 \left[ \frac{bu}{ac} \right] + 0.54 \left[ \frac{bu}{ac} \right] \right)} = 0.9\%$$

### Massey Ferguson 9795 w/ OEM Concaves – 4.1% Loss

- Concaves: Small Wire
- Crop: Wheat
- Yield: 60 bu/ac
- Header Width: 30 ft
- Discharge Width: 63 in = 5.25 ft
- Good Seeds: 862
- Moisture: ~17%

- Speed: 2.5 mph

$$L \left[ \frac{bu}{ac} \right] = \frac{\frac{Q[\text{kernels}]}{A[\text{ft}^2]} \div \frac{W_h[\text{ft}]}{W_d[\text{ft}]}}{20 \left[ \frac{\text{wheat kernels}}{\text{ft}^2} \right] \left[ \frac{\text{ac}}{\text{bu}} \right]} = \frac{\frac{862[\text{kernels}]}{2.965[\text{ft}^2]} \div \frac{30[\text{ft}]}{5.25[\text{ft}]}}{20 \left[ \frac{\text{wheat kernels}}{\text{ft}^2} \right] \left[ \frac{\text{ac}}{\text{bu}} \right]} = 2.54 \left[ \frac{\text{bu}}{\text{ac}} \right]$$

$$\% \text{ Loss} = \frac{2.54 \left[ \frac{\text{bu}}{\text{ac}} \right]}{\left( 60 \left[ \frac{\text{bu}}{\text{ac}} \right] + 2.54 \left[ \frac{\text{bu}}{\text{ac}} \right] \right)} = 4.1\%$$



## Massey Ferguson 9690 w/ Box Concaves – 0.6% Loss

- Concaves: 3 Max Thresh, 2 Standard, 2 Round Bar
- Crop: Wheat
- Yield:  $\frac{60+90}{2} = 75 \frac{bu}{ac}$
- Header Width: 25 ft
- Discharge Width: 43 in = 3.58 ft
- Good Seeds:  $\frac{110+221+276}{3} = 202.33$
- Moisture: ~15.1%
- Speed: 1.8-2 mph

$$L \left[ \frac{bu}{ac} \right] = \frac{\frac{Q[kernels]}{A[ft^2]} \cdot \frac{W_h[ft]}{W_d[ft]}}{20 \left[ \frac{wheat\ kernels}{ft^2} \right] \left[ \frac{bu}{ac} \right]} = \frac{\frac{202.33[kernels]}{2.965[ft^2]} \cdot \frac{25[ft]}{3.58[ft]}}{20 \left[ \frac{wheat\ kernels}{ft^2} \right] \left[ \frac{bu}{ac} \right]} = .49 \left[ \frac{bu}{ac} \right]$$

$$\% \text{ Loss} = \frac{0.49 \left[ \frac{bu}{ac} \right]}{\left( 75 \left[ \frac{bu}{ac} \right] + 0.49 \left[ \frac{bu}{ac} \right] \right)} = 0.6\%$$



