Estimating Seed Losses

To estimate the loss of free (threshed) seed over the shoe or the straw walkers, use a seed dockage pan with appropriate sized holes, placed on top of a blank pan. A 7/64 inch round-hole top pan is recommended for alfalfa. Hold the two pans in a sampling location and shake them vigorously primarily in a horizontal direction while following the combine for four steps (11 feet). Then, count or estimate the number of seeds in the blank pan. *A close-packed, single layer of alfalfa seed in the pan contains about 250 seed per square inch.*

In checking the cleaning shoe, take samples at the center and near both sides of the area where most of the chaff is discharged. Also, take three samples in the air stream above the rear of the shoe. Add the average seeds per pan sample from the chaff discharge area and the average from the airstream area. Multiply this sum by the ratio of the shoe width to the pan width to obtain the total number of seeds discharged across the full width of the shoe. Then multiply this number of seeds (expressed in hundreds) by the appropriate factors from the following table (Table 1) to determine the shoe-free seed loss in pounds per acre. There is an example of these calculations on the following page. The walker loss can be checked in a similar manner. The estimates of free-seed losses obtained in this manner are only rough approximations and are likely to be lower than actual losses.

Table 1. Factors for Estimating Alfalfa Seed Losses

Approximate number of seeds per pound	Loss (lb/acre) for each 100 seeds discharged from full rear width of machine during 11 feet of forward travel					
	for any width of cut, w*	11' cut	13' cut	15' cut	17' cut	19' cut
220,000	1.80/w	0.16	0.14	0.12	0.105	0.095

*Actual width of cut = number of rows x row spacing.

Shatter losses from the header can be determined by counting the average number of alfalfa seeds per square foot of harvested land area and dividing the number of seeds by 5, to obtain the loss in pounds per acre.

Desirable Range of Seed Losses

The level of seed loss that will give the greatest net return is influenced by the per-acre value of the crop, and by the ease or difficulty of attaining low losses. Operating at rates that result in seed losses below the most economic level reduces the net profit because of increased harvesting costs per acre. For many seed crops, the most economic level of total combine losses is probably between 2 and 5% of the yield. Increased crop value per acre reduces the desirable percent seed loss. Total losses in Ladino clover may be 5 to 10%, or even higher under some conditions, because of the difficulty in recovering this extremely small seed.

Example of Estimating Shoe Free-Seed Loss

Crop is alfalfa, header width = 16 ft., width of cut = 15 ft., shoe width = 44 in., sampling-pan width = 11 in. Estimated numbers of seeds in three samples from the chaff discharge area were 550, 450, and 530, and in three samples from the airstream area were 90, 120, and 120.

Solution

Sum of averages is 510 + 110 = 620 seeds
Ratio of shoe width to pan width is 44/11 = 4.0
Number of seeds discharged across the full width of the shoe is 620 x 4.0 = 2480
From the 15-ft. column in the table, the loss factor is 0.12

Hence, the loss is $0.12 \times \frac{2480}{100} = 3.0$ lb/acre

Possible Causes of Common Combine Operating Problems

1. **Excessive header loss**
   (a) Cutter bar too high
   (b) Reel speed too great
   (c) Reel too low or too far forward

2. **Excessive amount of unthreshed seed**
   (a) Cylinder peripheral speed too low
   (b) Cylinder clearance too great
   (c) Cylinder and concave bars worn, or not enough bars or teeth
   (d) Crop not in proper condition to thresh
   (e) Machine overloaded

3. **Seed cracked or otherwise damaged**
   (a) Cylinder speed too great
   (b) Cylinder-concave clearance too small
   (c) Load too light (insufficient straw to protect seed)
   (d) Seed moisture content too low

4. **Excessive free-seed loss over walkers**
   (a) Machine overloaded
   (b) Check curtain missing or in poor condition
   (c) Improper walker speed (engine speed too fast/slow)

5. **Free seed blown out over rear of shoe**
   (a) Excessive air blast
   (b) Air blast directed too far to rear

6. **Free seed carried out over rear of shoe**
   (a) Machine or shoe overloaded
   (b) Openings in chaffer-sieve too small
   (c) Insufficient air blast (sometimes)
   (d) Excessive amounts of free seed in tailings
   (e) Excessive amounts of fine material and chaff (can be from cylinder speed too great or cylinder-concave clearance too small)

7. **Excessive amount of chaff in tailings**
   (a) Chaffer-sieve openings too large
   (b) Chaffer-extension openings too large (if adjustable)
   (c) Insufficient air blast

8. **Excessive amount of free seed in tailings**
   (a) Cleaning-sieve openings too small
   (b) Excessive air blast
   (c) Shoe overloaded

9. **Poorly cleaned seed in grain tank**
   (a) Cleaning-sieve openings too large
   (b) Insufficient air blast