Assessing Harvester Damage and Pest Control Practices in Alfalfa Seed Fields

Harvesters will soon be moving rapidly through alfalfa seed fields in the San Joaquin Valley. At this point, you can only hope you have done everything right during the season to prepare for a good, clean crop, and hope that it doesn't start raining before you complete the harvest.

The major problems encountered during harvest are seed losses due to shattering, incomplete recovery of seed during threshing, and mechanical damage to seed which inhibits or prevents subsequent germination. These difficulties are made even worse by unfavorable weather conditions, poor land preparation, lack of weed control, either excessive or incomplete desiccation, and improper combine adjustment.

The only factor that can still be modified at harvest time to reduce seed loss and damage is combine adjustment. Problems attributable to other factors, such as poor weed or insect control, only serve to warn growers and PCA's to plan ahead for next season.

Assessing damage resulting from field operations is a simple process. First, combines should be inspected immediately before harvest begins. Calibrate the cylinder concave clearances and adjust the cylinder speed (RPM). Once the harvester begins to operate, draw a sample of seed from the bin and determine the percent injury. Injury is not always visible, even when using a hand lens. A microscope provides the proper magnification to detect hairline cracks or breaks in the seed coat, or damage to the seed itself.

A quick estimate of damage is often valuable and can be obtained by checking 4 to 10 seed samples.
1 chipped seed in a sample of 100 seeds = 3 to 5% damage.
2-3 chipped seeds = 5 to 10% damage.
If the percent injury is 5% or more, adjust the combine cylinder speed downward until the damage index falls below 5%. Seed samples should be tested throughout the harvest period to determine if conditions of weather, crop, or combine have changed to cause an upward trend in the damage index.

Most seed damage is due to either impact in the cylinder because of small loads, or excessive cylinder speeds. When small amounts of material pass through the cylinder, seed damage tends to be greater than when the load is heavy, although seed ***losses*** increase with heavy loads. Loads may be balanced by increasing or reducing the speed of the combine as it moves through heavy and light areas in the field. By varying the forward speed of the combine, the amount of straw fed into the harvester remains fairly constant.

With regard to cylinder speed, a balance between damaged seed and incomplete threshing must be achieved. Reducing cylinder speed will reduce damage to the seed, but seeds will not be removed from the pod during threshing if speeds are *too* low. Generally the benefits derived from reducing cylinder speeds are not confined to improved seed quality. The lower speeds leave the straw in much better condition - longer pieces and less chaff - so that the seed can be separated and cleaned more efficiently and with less loss over the rear of the machine.

Using damage assessments to adjust combines would greatly improve the quality of harvested seed. Every lost or damaged seed occurring during harvest is removed from the profit side of the grower's operation. After the crop is grown and the seed is ready for harvest, don't lose it through poor operating methods!

Seed samples collected from the harvester can also be used to assess pest management practices employed during seed development.

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Suggested Combine Adjustments

alfalfa cylinder speed = 4000-5000 ft/min, cylinder-concave clearance = 1/8 to 3/8 inch, type of cleaning sieve 1/10 inch

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The level of insect damage caused by sucking insects (lygus and stink bugs) during the season, and by the seed chalcid after seed development, can both be evaluated by examining the seed from the harvester bin. Late season lygus populations often build up in the "green spots" of a seed field. Lygus bugs present in the field after pods form will feed on the immature seeds, causing them to shrivel and turn brown. These signs of damage should not be confused with water or heat-damage which would result in seeds that are lightweight, wrinkled, cracked, or off-colored.

Chalcid damage is easily detected since the adult emerges by chewing a conspicuous hole through both the seed and the seed pod.

When examining the seed from the harvester, also check the number of weed seeds present in the sample. Even though a large population of common weeds in the field may not be cause for denying certification, when the seed is cleaned to remove soil and weed seeds, much of the alfalfa seed can be lost in the process.

Fall Pest Management Practices in Alfalfa

There are two pests of alfalfa seed crops that can be controlled once the crop is harvested: the *Seed Chalcid* and the *Stink Bug*.

Chalcid damage varies annually and from field to field. Control measures must be accomplished in the fall after harvest and during the winter and spring. Fall clean-up practices not only aid in controlling chalcid fly populations, but they also improve the next year's production.

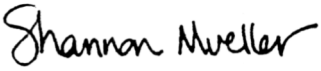
During the season, the eggs of this tiny wasp are laid inside the developing seeds which the larvae destroy from within. The adult emerges by chewing a conspicuous hole through both the seed coat and ripened pod, so damage is easily recognized. Chemical control of the chalcid fly has been ineffective since eggs, larvae, and pupae develop within the seed and are protected from insecticides used in the field. Late maturing fields usually develop heavier infestations because the insect has a longer period to develop and thus more generations may occur. Continuous emergence of the chalcid adult from the seed, and migration from outside sources, make insecticide applications futile.

Field sanitation is the best approach to controlling the chalcid problem, and for the most effective results it should be on an area-wide basis. Fall clean-up practices aimed at breaking the life cycle of this pest include: (1) removal of volunteer alfalfa plants and other hosts, (2) preventing seed set on regrowth after harvest, since this offers an ideal over-wintering site for the chalcid, (3) chopping or burning the straw to facilitate discing and burying chalcid-bearing seed, (4) irrigating the stand to rot the chalcid-infested seed and germinate seed shattered during harvest, and (5) covering seed hauling trucks to prevent introducing volunteer alfalfa plants along roadways.

Cultural practices aimed at controlling chalcid will also aid in the control of stink bug. Stink bugs cause major damage by sucking the juices from immature alfalfa seed. Damage is usually heaviest during late bloom when there are many maturing pods. In fields where lygus have been controlled, but a high percentage of shrivelled seed appears at harvest, you may consider stepping up efforts to control the stink bug.

Stink bugs overwinter in the adult stage, living in plant debris in a hibernation-like condition. It is difficult to kill the insects during this time since they are not moving around or feeding. Removing the plant debris in which they overwinter and keeping the field edges free of weeds is one measure that can be taken by growers in the fall to interrupt the life cycle of many stink bugs which would otherwise overwinter.

Just because the seed is in the warehouse does not mean the season is over for alfalfa seed producers. Now is the time to prepare for an even better harvest in 1991.



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