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Tests Show How Injury Lowers Quality of Seed

By JAMES C. DELOUCHE and C. HUNTER ANDREWS

Mechanical injury to soybean seed is a serious problem and one of the principal causes of low seed quality. The problem gains in importance as seed production expands to meet the needs of an increasing acreage within the state and developing out-of-state seed markets. Soybean seed are relatively more susceptible to mechanical injury than other kinds of seed. The seed coat or protective covering is thin and the delicate embryonic root lying directly beneath the seed coat is in a very vulnerable position.

Injury to soybean seed results primarily from impacts of the seed with hard surfaces or other seed. The extent and severity of mechanical damage is related to the moisture content of the seed, the velocity of the seed at the moment of impact, and the degree of hardness of the impacted surface. Seed at moisture contents of 12 percent or less are hard, brittle and rather easily injured. A single 10-foot drop against a metal surface can reduce germination of such seed by as much as 10 to 15 percent (Table 1). On the other hand seed at 14 percent moisture or above are relatively unaffected by impacts resulting from drops as high as 20 feet. The effects of mechanical abuse are cumulative. Successive impacts continue to reduce germination although at a decreasing rate (Table 2).

Mechanical abuse to soybean seed has several effects. Some of the seeds become incapable of normal germination immediately after impact. Others not so severely damaged deteriorate more rapidly in storage than uninjured seed or succumb more easily to adverse field conditions after planting.

Injury to soybean seed is not always visible to the naked eye. The seed coats of severely injured seed might be intact and the seed have a perfectly normal appearance. Generally, however, a high percentage of split or cracked seed, and seeds with broken seed coats is indicative of severe mechanical injury. Removal of the splits or even cracked seed by processing, however, does not necessarily eliminate the problem.

Minimizing Injury

Although injury to soybean seed can result from handling during any of the production and processing operations, mechanical abuse during harvesting appears to be of most importance. Specifically, improper or careless operation of

the combine can result in a drastic reduction in seed quality. Preservation and protection of high seed quality requires that careful attention be given to the entire harvesting operation.

1. Keep soybean seed fields free of weeds. Weedy fields cause harvest losses.
2. Combine soybeans when they are between 12 and 16 percent in moisture content.
3. Combine when the pods are still damp with dew or recent light showers.
4. Use a cylinder speed just adequate for complete threshing of the beans.
5. Adjust cylinder speed to meet varying conditions relatively fast in the morning and relatively slow in the afternoon.

The procedures outlined above will generally produce good results. The story of seed quality, however, does not end with harvesting. Seed harvested at 14 to 16 percent moisture content should be dried as soon after harvest as possible. During processing, treating, and bagging, every precaution should be taken to insure that the seeds are not mechanically abused.

The quality of Mississippi grown soybean seed at the time of harvest is high. The seed producer must do his part to preserve and protect this high quality through the various harvesting, drying, and processing operations.

Table 1. Effect of height of drop and seed moisture content on percentage germination in soybeans.

| Seed Moisture Content | Height of drop (ft.) | | | |
|--------------------------|------------------------|----|----|----|
| | 0 | 5 | 10 | 20 |
| | Percentage germination | | | |
| 6 | 98 | 88 | 80 | 67 |
| 8 | 98 | 88 | 78 | 70 |
| 10 | 98 | 90 | 82 | 73 |
| 12 | 98 | 97 | 94 | 87 |
| 14 | 98 | 97 | 97 | 97 |
| 16 | 98 | 98 | 96 | 96 |
| 18 | 98 | 96 | 97 | 96 |

Table 2. Effect of successive 10 foot drops on percentage germination of soybeans at various seed moisture contents.

| Seed Moisture Content | No. of 10 ft. drops | | | |
|--------------------------|------------------------|----|----|----|
| | 0 | 1 | 2 | 4 |
| | Percentage germination | | | |
| 6 | 98 | 80 | 73 | 62 |
| 8 | 98 | 78 | 65 | 53 |
| 10 | 98 | 82 | 73 | 62 |
| 12 | 98 | 94 | 88 | 81 |
| 14 | 98 | 97 | 96 | 98 |
| 16 | 98 | 98 | 98 | 96 |
| 18 | 98 | 97 | 97 | 97 |