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## MINIMIZING MECHANICAL SEED MIXTURES

R. C. Milner<sup>1</sup>

Quality control involves many aspects of seed production, and like other segments of quality control, minimizing mechanical mixtures is extremely important.

Mixtures of concern when producing seed are:

1. Seed of other varieties
2. Seed of other kinds (other crops), and
3. Weed seed.

When going about the tasks of preventing mechanical mixtures, all phases of seed product in must be considered, including:

1. Field Production
2. Harvesting and Storage, and
3. Seed Conditioning.

### Field Production

The areas of field production that must be considered when preventing seed mixtures include:

1. Selection of planting seed
2. Land selection
3. Planting equipment
4. Isolation of the seed crop from other varieties and/or other crops.

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### Selection of Planting Seed

After it has been decided what crop and variety of seed will be produced, the seed that is selected to plant to produce this seed crop must be free from seed of other varieties, of other crops, and of weed seed, if a pure seed crop is to be produced.

The seed label can be very helpful in selecting the best planting seed. The seed label should indicate the presence of seed of other varieties, other crops, and of weed seed. It is further recommended that a representative sample of the seed be obtained before planting and that you have the sample analyzed for the presence of other seed by a reputable seed testing laboratory, either State or private.

### Land Selection

After being convinced of the purity of the planting seed, land must be selected for producing the seed crop.

Land selection is a much more important part of seed production than some might believe. What crop was produced on the land last year or in recent years? Many crops produce "Hard-Seed" which can produce volunteer plants the following year or for several years after being grown on the land.

Too, the land may be contaminated with weeds that produce seed that are difficult or impossible to remove from the seed being produced, by conventional seed cleaning equipment.

### Planting Equipment

When the planting seed and the land for producing the seed crop have been selected, the planting equipment that will be used to plant the crop must be thoroughly cleaned to remove any contaminating seed from previous use. Failure to remove such seed will result in mixtures in the seed field.

### Isolation of the seed crop from other varieties and/or other crops

In addition to preventing cross-pollination of cross-pollinating crops, proper isolation of the seed field from fields of other varieties and/or other crops is necessary to prevent mechanical mixtures during harvest. An adequate clipped or disked space between different varieties and/or crops must be provided, for turning the harvesting equipment, in order to prevent the harvester from picking up seed from adjacent fields.

### Harvesting and Storage

When the seed crop has been successfully produced without seed mixtures, it then becomes necessary to further prevent seed mixtures by preparing the equipment to harvest the seed crop.

Items that will be used during the harvesting operation are:

1. The harvester (combine for other equipment)
2. Hauling equipment
3. Seed handling equipment
4. Storage bins.

### The Harvester (combine or other equipment)

The harvester is probably the most difficult piece of equipment to clean that will be used in seed production. For this reason suggestions will be made here that should result in the best cleaning job and will allow the job to be done in the shortest period of time. Time lost in the clean-up operation can be very important when the seed field is ready for harvest and the weather is favorable for harvest, since delays in harvesting after seed maturity can greatly reduce seed quality.

Washing the combine with large volumes of pressurized water, to remove seed that is left in the combine from previous use, is the most efficient method of cleaning and will result in the most thorough cleaning job.

The use of compressed air, which is favored by some to remove seed from the combine, tends to cause the seed to bounce back and forth in the machine and will slow down the cleaning process.

There are some preparations that will be needed before starting to wash the combine. Remove or open all doors, inspection plates, side panels and seed screens of the combine. This will allow easier access to the areas to be cleaned and allow seed to be more easily removed during the washing operation.

Instead of starting the washing procedure at the cutter-bar or header, where the seed being harvested will enter the combine, first wash the short return auger that discharges material directly over the cylinder or thrashing area. If the return auger were to be cleaned after the cylinder area has been cleaned, material from the return auger would be washed onto an area that would have already been cleaned. From the cylinder area, wash back through the machine following the path the seed will take during the harvesting operation.

During the process of washing, allow the combine to operate occasionally with a good amount of water in the combine. The action of the moving parts and the turning of the seed augers with plenty of water pressure will greatly aid in flushing seed and trash from the combine.

Now wash the seed elevators and grain hopper and remember to thoroughly wash the unloading auger. Wait until last to wash the feeder chain leading from the header deck. Wash the feeder chain toward the header deck. Then wash the header deck and cutter bar. Go back through the combine with a good light to be sure that no seed is left in the machine.

### Hauling Equipment

After harvesting, seed will then have to be transferred from the harvester to the storage bin or directly to the conditioning plant; therefore clean hauling equipment must be provided for this purpose.

Use the same approach when cleaning grain carts as was used when cleaning the combine. Open all doors, remove caked-on material, then wash in a systematic manner that will not re-distribute contaminating seed to areas that are already clean.

Trucks with welded steel beds are usually fairly easy to clean since there are few cracks for seed to lodge; however, trucks with wooden beds pose more of a problem to clean since there will usually be many cracks in sides and floors of wooden beds where seed can lodge.

Remember to clean ledges of the framework of the truck under the truck bed. If seed is not removed from these ledges, nothing will prevent seed from these areas from falling into the dump-pits or other unloading facilities while the truck is being unloaded, thus causing seed mixtures at that point.

### Seed Handling Equipment

Remember to thoroughly clean handling equipment such as dump-pits, elevators, augers and conveyors before using.

### Storage bins

Unless seed is to be transferred from the field directly to be conditioning plant, some clean place must be provided to store the seed.

In addition to thoroughly sweeping and vacuuming the walls and floors of the storage bin, make sure that all seed is removed from cracks along the walls and floors, especially at the junction of the walls and floors. Usually there will be flanges at these junctions where considerable amounts of seed can be lodged. Make sure that no

seed is lodged in such places as in ledges over the doors and where ladders are attached to the walls of the bins.

Most storage bins will have an unloading auger located under the bin floor. Several pounds of seed can be contained in the auger housing tube. To aid in the cleaning of this area, first remove the auger from the tube, then close all doors of the storage bin and allow the aeration system to operate. This will blow loose seed from the tube.

### Seed Conditioning

The final stage of seed production, before the seed is safely in the seed bag, where mixtures can occur is during seed conditioning or seed cleaning operations.

Anything that is left in the plant from previous use can end up in the seed bag; therefore, thorough cleaning of the plant must be completed before seed conditioning begins.

Equipment and areas of the plant that the seed to be cleaned will come in contact with are:

1. Dump-pits
2. Conveyors
3. Elevators
4. Holding bins
5. Seed cleaning equipment, and
6. Bagging equipment.

Before cleaning the equipment in the plant, seed should be removed from walkways, framework of the building, other ledges located above the equipment in the plant. If these areas are not cleaned first, seed can fall after the equipment below has been cleaned or during seed conditioning causing mixtures.

Like the prevention of mechanical mixtures in the other areas of seed production, the primary goals when cleaning the conditioning plant should be first, to remove all seed in the plant from previous operations and second, to do this job in a reasonable length of time. Few seedsmen can afford unnecessary "down-time" for the plant clean-up operation.

These goals cannot be attained unless there is a definite clean-up plan established in advance in order that the clean-up operation can be done in a systematic manner. If the cleaning is done at

random, cleaning a little here and a little there, it is difficult to know when the cleaning job has been completed and also, seed could be redistributed in areas of the plant that have already been cleaned.

After walkways and ledges of the building have been cleaned, then the cleaning of the plant itself should begin at the point where the seed to be conditioned will enter the plant; then clean, following the path the seed will take as it moves through the plant during conditioning. Make sure each area is thoroughly clean before moving to the next area to be cleaned.

Start at the dump-pit and clean each elevator, conveyor, holding bin, and each piece of cleaning equipment until the bagging equipment has been reached and cleaned.

Then go back through the entire plant using a good light and make sure all seed has been removed.

Only after having done all the things in all phases of seed production that have been discussed here, can the seedsman be confident that the seed offered for sale will be pure and free from mechanical mixtures.