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Processing Forage Grass Seed

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PROCESSING FORAGE GRASS SEED

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This presentation could be made about any number of forage grass seed. Being most familiar with Kentucky 31 Fescue, the emphasis of this presentation will be upon the methods that we use in processing tall fescue seed.

The first step, and a most important one, in processing grass seed is receiving material direct from the combine or the farmer. Each load is sampled when it is delivered. From this sample, we determine seed moisture and any crop or weed seed separation problems likely to occur as the seed moves through our processing plant. Our concern with moisture is twofold: (a) how difficult the seed will be to dry and (b) how difficult they will be to hold in the storage bins.

We are also concerned with the number of weed seed, each one having its own characteristics and potential separation problem as it passes through the processing equipment. The only weed seed that causes us to refuse a load of fescue is Johnson grass. Johnson grass is a problem in so many states that we do not accept any seed that contain its seed. Other weeds that are a concern to us are; curlydock, ox-eye daisy, buckhorn, and sheep sorrel. These are the weed seed that give us the greatest problem, however, we have the necessary equipment to remove all of these seed.

The other crop seed that we usually find in Kentucky 31 fescue are ryegrass and orchardgrass. Orchardgrass is the predominant other crop seed. A determination is also made for the amount of inert material, which is primarily light, immature seed or chaff. To make this determination, we use a sample blower, such as the South Dakota seed blower. We are also concerned with the amount of straw and chess. Our pre-cleaning examination gives us an indication of what problems will be encountered in drying and storage, and then later as the seed move through the processing equipment.

Drying Methods

The first decision made after the pre-cleaning examination concerns the drying method. All the seed received directly from the combine has excessive moisture. One alternative, and the one that we like, is having our customers dry the seed at home. We have a few people who are using swathing equipment whereby the field is swathed, left in the sun to dry, then later threshed by combine and delivered to us in a dry state. When the seed are delivered "wet", one method we have used in

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the past, and still use when we have a large crop, is yard drying. To yard dry, the seed are spread on the ground, turned each day in the sun, placed in wind-rows at night in case of rain, and after 4 to 7 days, depending on the weather, they are then placed into bulk storage.

The "outside air-tunnel" is another drying method. In this case we use fans, and false-bottom air floors beneath the piles of seed, and blow natural air through the seed. This results in some drying. If the weather is "dry", seed can be completely dried using these outside air tunnels. Another method that we use is "inside, natural-air". With this method, the false bottom floors are placed in tobacco warehouses, barn lofts and other storage buildings and natural air is blown through the seed until they are completely dried.

Another system that we use for drying is a continuous-flow, hot-air dryer. We have one unit made by the Ferrell-Ross Company. It is a continuous-flow dryer made specifically to dry grass seed. This dryer will remove five to eight percent moisture at the rate of 5,000 pounds per hour.

We also have drying and storage combination units. These are nothing more than round grain bins with air-floors and stirring devices that continually stir the seed as warm air passes through them. The important thing to remember in either a continuous flow dryer or in a drying bin is the air temperature used. We never use air exceeding 140F. We have found that temperatures above 140F for any period of time will kill the germination. The temperature of the exhaust air is usually 90-100F.

Naturally we cannot clean the seed as fast as they are dried, so we simply have to find some place to store the dry seed. We use temporary holding bins. These again can be round grain bins with nothing but air tunnels to change the air occasionally while the seed are held in temporary storage. The drying bins with stirring systems are what we would refer to as permanent storage bins with dryers.

Cleaning Methods

As the seed comes into the processing plant, the screen cleaners are the first stage in processing. If the seed happen to be rough, containing a lot of chaff or straw, a scalping cleaner with screens that have large openings is used. The scalper is used only to take out the large material or fine chaff. From the scalper, the seed move to air-screen cleaners that are set with screen sizes capable of removing large cheat and/or chess. A 1/22 x 1/2 perforation will remove smaller cheat or chess. Use of a a 6 x 26- or 6 x 30-mesh screen on the bottom will drop some of the smaller seed such as bluegrass and weed seed such as ox-eye daisies.

The air systems, both top-air and bottom-air, are very important in cleaning tall fescue. With the top air, our equipment is adjusted to

remove only the fine light chaff and fine immature seed before the seed mass goes across the top screen. The bottom air is used to take out more light seed or chaff but not the full amount that might be in the seed. Later, I will discuss a final step that we use to obtain the level of inert material desired.

After the air-screen cleaner, the next unit of cleaning equipment is the disc, a length separator. The purpose of this machine is strictly one of removing weeds or inert matter. There are two sections in our disc separator. The first section is used to remove cheat or chess, some wild onions, any small sticks or stems that may have passed through the air-screen cleaner; the second section is for weed removal. The discs in the machine vary in size and number depending on the type of weed problem and the model of disc separator. There is a definite size pocket for a particular type of weed such as curled dock, buckhorn, daisies and sorrel. All of these require disc pockets of different size for the removal of a particular weed.

With discs or other length separators, capacity is always important in a processing plant. One thing we have found necessary for efficient operation of a disc (length) separator is an automatic feeding system. This will keep the level of seed in the upper series of discs at least level with the axle or center of the discs at all times. When the seed level falls below the center line, you are losing capacity. In our plant we installed an additional, small, disc separator to catch the overflow from the upper series of discs. This increased our processing capacity by 25-30%.

Maintenance is very critical to the proper operation of a disc separator. Because of the continuous agitation that takes place in a disc, it is necessary to have a dust collection system. As the seed are turned in this machine, small tips are broken off and they make dust. As the dust falls on the discharge troughs, if it is not removed, it soon builds-up and will not permit the discharge of the materials that the discs are lifting. A second critical point to observe with disc separators is pocket wear. As seed pass through the discs, the pockets show more and more wear and soon will wear to the point they will not lift the shorter material.

After the seed pass through the disc separator, the next machine is the width and thickness grader. Ours are made by the Carter-Day Company. The primary purpose of this unit is to remove foreign materials. The screen size used for fescue is a 4½/64-inch round perforation. It is a cylindrical screen (shell) in which the seed are rotated and must stand on their ends to fall through the holes. Any sticks, stems, weeds or clusters of seed that do not pass through the holes, pass through the shell and are classed as foreign material. The advantages of the width and thickness grader are many: it is very effective for removing wild onion; it will remove any leaves or damaged seed that have been flattened in other stages of processing or combining; it will remove orchardgrass clusters, therefore, reducing the other crop content in the fescue;

it removes other material that fit into the disc pockets but was too wide to pass through a 4½/64-inch diameter round hole.

Maintenance is also very important for proper operation of a precision grader. Dust collection again is very important. The tumbling action of the seed creates a considerable amount of dust, and without dust removal equipment the dust wears out the bearings and chains of these machines. The drive chains on precision graders tend to wear fast and should be checked periodically for wear and replaced as necessary or they will soon begin to give trouble. The variable speed feeder is another important part of the precision grader. The feed control must maintain a constant feed to obtain maximum production and still clean the seed as desired.

The last machine fescue goes through in our plant is an aspirator. Our unit has a closed circuit air system, meaning there is no exhaust, therefore, it is not necessary to have it located close to a dust collection sytem. The purpose of the aspirator is to remove light foreign material.

This is the stage, referred to earlier, where we reduce the inert matter content of the seed lot to the point where we can maintain or evaluate pure seed standards - 98% pure seed, 99% pure seed, at whatever level we desire. Since installing this machine, some three years ago, I have found a high degree of accuracy in obtaining the desired inert matter content. Another advantage of the aspirator is a lower dust content in the finished bag of seed. As mentioned earlier, when the fescue seed passes through these different pieces of machinery a certain amount of dust is created by the seed rubbing together. The aspirator will lift this light dust and at the same time it will lift that inert material you wish to remove. The control of inert material in seed is very important, not only from appearance standpoint but from an economic standpoint since most all forage grass seed are bought and sold on a standard basis; such as 98% purity for #1 fescue seed.

The aspirator will help you maintain the desired purity level more accurately than adjusting the bottom and top air on the air-screen cleaner and with a lower loss of good seed. When the top and bottom air systems of the screen cleaner are set at the level to remove the maximum amount of inert material a certain amount of light seed of good germination and quality are removed. These good seed ride out, or are carried-out, with the mass of inert material and chaff in an air-screen cleaner but not the aspirator. From the aspirator, the seed are conveyed to the to the bagging bins.

There are, no doubt, some points I have failed to cover in the processing of forage grass seeds. For example, it has been my experience, processing all types of seed, that it is best to read the manufacturer's directions on each piece of machinery, especially on new machines placed in your flow system. Then by trial and error gain

experience, learning what you can do with the particular machine to get maximum capacity and maximum effectiveness.

If you have specific questions about processing grass seed, I will be glad to try to answer them either by phone or letter, if you happen to be in Hardinsburg, Kentucky, I would be glad to show you though our plant. We have in operation all the machines discussed in a continuous flow system, from dryer through bagging.