SESAME HARVEST GUIDE

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www.sesaco.net
QUICK FACTS

When the crop stops flowering, there are 50-60 days until combining.

There are no harvest aids labeled for harvesting sesame.

Swathing is no longer recommended because of lower yields and grades.

The capsule is bred to open at the tip to reduce the time to harvest and allow sooner re-entry to the field after a rain.

Non-dehiscence is defined as a capsule on the main stem that will retain over 65% of its seed 3 months after ready for harvest and yet will release the seed in the combine.

All combine colors have successfully harvested sesame.

Clean the combine before starting – wet or spoiled seed under the auger can ruin a truckload of sesame. If it rains while combining, clean out the combine before restarting.

Reset your combine when moving from corn, sorghum, or wheat – sesame requires gentler handling – it is 50% oil.

The concave should be as wide open as possible and then close down a bit.

The cylinder speed should be as slow as possible to move the material through the combine.

No one setting for a combine will work in all conditions. Be prepared to change the settings when entering new fields or even within a field.

Speed is dependent on the amount of plant mass. When harvesting a good crop, the speed needs to be slow enough to allow the combine to separate the seed rather than pushing it out the back.

Moisture is critical – harvest at 6% or less.

The field can be brown (particularly after a frost) but still too green. You should be able to snap the stem instead on bending it.

When entering the field, cut a representative sample and do run a moisture on the sample.

Biggest mistake is cutting driest part of field, getting a green light to harvest, and then moving into greener sesame.

Visual clues for being dry enough: dust coming out of header, the sesame in the grain bin shifting in the bin when turning around.

Put on your glasses and check for broken seed. Proper moisture and less than 2% broken or scuffed seed are the keys for better grades.

Every combiner wants to fill the bin to the top to cut down on dumps. Empty the bin when the sesame gets to the bin auger. The churning will damage the seed and reduce your price.

The only way to check for seed going out the back is to throw an oil pan under the combine between the header and tail as it is moving through the field. The seed on the back of the combine is not a good indicator.

Keep seed out of the return auger. It will increase the broken seeds.

There will be seed on the ground from the header striking the sesame. However, 33.4 seeds per square foot on every square foot represents a mere loss of 10 lbs/ac.

Fires are rare, but they do happen. Small trash on hot surfaces, such as near a bearing or the transmission, may smolder. Sparks may fly out of the exhaust. Put out the smoldering – do not blow it off and risk blowing the fire into the combine.

Buy a new roll of duct tape for the combine and the trucks.

One 18 wheeler full of sesame is worth $17,600 – protect your harvest.

Per the contract, trucking assistance is provided.

Receiving, weighing, and sampling are open to inspection by the grower. Two samples are taken. One is kept at the local facility, and the other is sent to a third party laboratory for grading.

Per the contract, settlements are made within 30 days from the last load from that entity.
INTRODUCTION

Welcome to the 31st anniversary of Sesaco harvesting sesame in the United States.

It should not be overlooked in this guide what separates Sesaco sesame from all other sesame in the world: non-dehiscent (ND) and improved non-dehiscent (IND) patented traits. The later developmental stages of Sesaco sesame is where the remarkable difference lies. Sesaco sesame is the only sesame in the world developed to be harvested mechanically directly from the standing crop with a conventional combine without binding or swathing.

This guide will describe the final stages of sesame as it nears harvest, harvest aid research, how to determine when to harvest, the philosophy of operating a combine in ND or IND sesame, field harvesting evaluation techniques, delivering sesame to a Sesaco receiving facility, grading, further processing of sesame, and the benefits of the sesame for following crops.

The most important guideline is to harvest on time. As with all crops, the highest yields are harvested on time. There is no weather event that will add yield and yet there are many weather events that will reduce yield.
CROP PROGRESSION TO HARVEST

Overview

It is important to understand how the sesame crop terminates in order to be ready for harvest. In ideal weather conditions, there is a large window for harvesting sesame, but Mother Nature does not always cooperate. As with any crop, harvesting at the optimum time increases payable yield.

Nominally, the crop will be harvested 130 days after planting; however,

• Earlier planted sesame generally takes longer to complete its cycle than later planted sesame.
• High moisture and/or fertility increases yield and delays harvest.
• Winds, good sunshine, higher seasonal temperatures, and low humidity can decrease drying time.
• Rains and cool weather can extend drying time.
• Sesaco 32 and Sesaco 30 go from full maturity to ready to combine faster than all previous Sesaco varieties.

The following paragraphs summarize the later stages of sesame. For a full description of the phenology of sesame, refer to Growth and Development of Sesame available on the internet at www.sesamegrowers.org.

Late Bloom Stage

This stage begins when the branches and minor plants stop flowering. The late bloom stage defines the last irrigation. Irrigating after this stage will be wasted or maybe even harmful in causing regrowth and/or preventing timely drydown. This is the best time to understand how your fields will drydown since final drydown parallels how the flowering ends in the field. This is the time to compare fields to make harvesting plans. The field that ends the late bloom stage first will most likely be the first to harvest, even if it wasn’t planted first.

Most sesame fields are like doughnuts, in that the outsides of the fields flower longer than the insides of the fields. Sandier areas, hills, and fields with less fertility will stop flowering and will mature sooner. This is a time to walk into the field. This stage ends when 90% of the plants have no open white flowers.

From the end of this stage, the crop will be harvested in 50 to 60 days without harvest aids.

Ripening Phase

This phase is not divided into stages and technically, it starts during the reproductive phase when the first capsule is formed. During this phase, most of the leaves fall off the plants. Generally, leaves will turn yellowish green before dropping. The leaves that drop due to drought are not considered self defoliation by maturity. This stage ends at physiological maturity (PM). PM is when 75% of the capsules on the main stem have seed with final color (goes from a milky white to an off-white) and a dark tip. The seed will also have a dark seed line on one side. PM is important because after that point, the crop is less susceptible to yield loss due to frost. It is also an indicator that the time to use harvest aids is approaching.

Within the green capsule, the S32 seed will change from a milky white color in the capsule on the left to the buff color in the capsule on the right when the seed is physiologically mature.

These S26 seeds are physiologically mature. Note the dark line and the dark tips on the seeds. The line is only on one side of the seed. Note from the side view that the seeds are somewhat flat. S26 and S28 seed have a lighter color than S32 seed.

From the end of this stage, the crop will be harvested in 30 to 40 days. At this point is when you should have the yes answer to the question, “Are the combines and trucks or custom harvester and haulers ready?”
**Full Maturity Stage**

The **full maturity** stage is critical because it is at the end of this stage that harvest aids may be applied to help initiate the drydown of the crop. Generally, the sooner the harvest aid is applied, the better chance for favorable drying conditions and the sooner the crop is cleared from the field for the next crop. Most plants absorb the harvest aid better when there is still some active growth, and thus, the harvest aid is more active but too early an application is detrimental to yield and quality. See Section on Harvest Aids. This stage ends when 90% of all plants have seeds mature to the top of the plant.

**Initial Drydown Stage**

During the **initial drydown stage**, new growers begin to worry about capsules opening. Capsules are supposed to crack open at the top. Cotton has to open to be harvested. Sesame has to open to drydown. There will be some seed loss out of the tips of the capsules. These seed are generally smaller and lighter and may even be immature seeds. The bulk of sesame crop’s weight is further down in the capsule and new varieties are getting more seed in the bin than ever before by any other means. This stage ends when 10% of the plants have a dry capsule.

**Late Drydown Stage**

The **late drydown stage** is the final stage we have been waiting for. The stage ends when the seed has 6% moisture and can be harvested. Once the crop is dry, nothing good can happen. Although the shatter resistance has been dramatically improved in the last 5 years, rains and winds will still shatter sesame and decrease yields. **Harvest on time.**

**PRE-HARVEST CONSIDERATIONS**

**Weeds**

Weeds can delay harvest and if harvested into the bin, can result in discounts in grading. Green weeds can add moisture to the bin. The sesame can be dry and yet in the combine bin and the truck, the moisture from the weeds will be absorbed by the sesame seeds. The two major problems are pigweed and field grass. Pigweed has a lot of moisture in the stems. Green field grass will not blow out the back of the combine and will go in the bin with a remarkable amount of moisture.

Certain weeds can be a serious problem in processing sesame. A large percentage of any weed seed can be a problem cleaning out of sesame, even though it may be as small as pigweed or as large as morning glory seed. Certain seeds are more of a problem, even in small quantities: johnsongrass, mintweed, and kochia. No one wants any other seed on top of their hamburger bun than sesame.

Although much of the johnsongrass is a different size to the sesame, the johnsongrass seeds can go through the round holes of the cleaner head first. Once through the cleaner, they have a close specific gravity to sesame seed and cannot be easily separated on the gravity table. Finally, a portion will be close enough in color to sesame that it will not be separated by the color sorter.

Mintweed is also the same size and specific gravity and will make it through the cleaning process. However, mintweed is a special problem in that when it comes in contact with water in dehulling, the seed coat will swell into a sticky gelatinous substance that will clump sesame seeds together.

**No Swathing, Only Direct Harvesting**

Sesaco sesame is harvested directly. It is not swathed prior to combining. As sesame matures and dries down, it will self-defoliate. Swathing has been tried and rarely works and results in price discounts. Since 2000, only 100 acres of sesame have been swathed, and the results on the 100 acres were poor.

**Harvest Aids**

There are no harvest aids labeled for sesame. Preliminary work with Texas A&M and Texas Tech Universities has shown that harvest aids may become a useful tool. There is some consideration to seeking a Section 18 for diquat (Reglone), and there is more...
testing being done with glyphosate (Round-up) and glufosinate (Ignite). Initial experiments showed that timing of harvest aids can become critical. Applying the harvest aid prior to physiological maturity can lower yields by as much as 20%. The optimum time for application is at the end of the full maturity stage.

Sesame does not need a harvest aid prior to a freeze, like cotton, to open capsules. The combine will take care of threshing out the seed from a dry capsule. It does not have to be opened chemically.

There are 4 reasons to consider a harvest aid:

- **Burn down green weeds.** This is the major use of harvest aids. Green weeds add moisture to the combine bin no matter how dry the sesame plants are, and the weeds may still be growing.

- **Evening up a field with two levels of drydown.** Many fields have low spots that will still be green while high spots are drying. In some cases, some seeds were left dry at planting and germinate with the first rain, making for two ages in the field. Applying a harvest aid can bring the field to a more uniform drydown.

- **Accelerate the drydown.** In the last 3 years, the drydown phase without a frost has ranged from 40 to 50 days. Some of the newer varieties are averaging 24 days. It takes 10-18 days for a harvest aid to dry sesame, and thus, acceleration may not be a cost effective method.

- **Stopping regrowth.** There are some varieties (S25 and S29) that have a tendency to stop flowering when they run out of moisture or fertility and then after a rain, begin flowering again. In most lines, the regrowth will start on new branches that emerge from the base of the plant. On these plants, the main stem and early branches will ripen and dry while moisture from regrowth will prevent harvest. The seed produced by regrowth has never exceeded what was lost from the early dry capsules.

**Start Clean**

Clean the combines before starting. Wet or spoiled seed can ruin a truckload of sesame!!!! If it rains between cuttings, reclean the combine. Sesame is food grade. Even if it has not rained, dew can collect and go to the auger and start to spoil the sesame that the auger has not cleaned out. At times, the sieves will not close because there is an old sorghum or corn stalk caught in the sieve. Always remove these stalks. Open sieves lead to trashier sesame and can lead to discounts.

**Harvest**

Understanding the principles of sesame harvest is the key to easing harvest time tensions. Once you understand these principles, you will agree that Sesaco sesame is one of the easiest crops to harvest. Although Sesaco has made huge accomplishments in the harvesting of sesame, a timely harvest will always maximize yield.

Sesame is one of the gentlest crops on harvesting equipment. There is no one setting for a combine that will work in all conditions. The quality of the stalks depends on the amount of rain, dew, and fog during the drying phase; the amount of time between the time the crop is ready to cut and is actually cut; and whether the crop dried down naturally or froze. The initial settings in Appendix 1 are a starting point and not a final setting.

On the first field of the year or any time that it has been an extended amount of time since last harvesting sesame, recheck the proper calibration to match the present environmental conditions.

**Moisture Matters**

For best yields, sesame must be harvested as soon as crop moisture falls below 6%. **Harvesting sesame below 6% is critical. Do not take this lightly.** Sesame above 5.1% starts getting docked for moisture weight, and above 6.9% moisture, there are quality discounts. Moisture weight below 5.0% is added back to the settlement. It is better to be drier. In any way possible, you should not minimize the importance of obtaining proper moisture on sesame. Sesame has 50% oil, and 6% moisture in sesame is equivalent to 12% moisture in corn. Sesame cannot be cost-effectively dried once it is combined.

Getting sesame below 6% moisture is no different than getting corn below 12% moisture. The best way is to test cut in a representative part of the field and take the sample to the receiving point to get the moisture. Note a second combine in the field in the background.

**Reaching 6% moisture is not difficult.** 91.3% of the sesame delivered since 2003 has been 6% or less, and the average moisture has been 5.1%. The crop should not be rushed. A few days of patience are all it takes. High moisture sesame is often caused by negligence from the grower. It is the most common reason for a grower to receive a price discount or even for a load to
be rejected. It is well worth the effort of sampling a field for moisture at the elevator.

To understand further when the crop is ready or dry, it may be compared to harvesting cotton with a stripper. Sesame should act in the same manner as in stripper cotton where the small branches and bolls snap easily from the plant. Two other indications: (1) snapping the main stem over a finger about 2/3rds of the way down the plant, and (2) inverting the capsule and pressing the capsule between your fingers cracking the capsule to release the seed. If the sesame stem does not make a clean brisk break and the seeds are not released from the capsule, more time should be allowed for drying or do further sampling and testing with moisture reading equipment.

The following are visual clues that the moisture is high:

- There is little or no dust coming out of the feeder housing.
- The sesame grain angle of repose increases (it piles up and peaks).
- The sesame will not slump in the bin when the combine makes the turn.
- The sesame is dirtier.
- The combine will hum louder as it struggles through wet plants.

High moisture not only leads to grade discounts for moisture but will often lead to more broken seed and higher dockage and foreign matter.

By using these techniques, monitoring humidity fluctuations and experience, determining sesame moisture becomes relatively easy in comparison to other crops.

Hand-held moisture meters can be effective by using the following guidelines:

- Start with a 12% moisture on a corn setting but do not trust it, yet.
- Check the hand-held meter against an elevator meter to know the highest setting on the hand-held that can be used. There is rarely a one to one percent moisture between the hand-held and the elevator meter. For example, if your first sample was 8% at the elevator and your hand-held says 13%, do not assume that when your hand-held says 12% that the sesame is 7%. Keep rechecking the hand-held against the elevator. A hand-held will vary over time.
- When pulling a sample for the hand-held, try to get it directly out of the auger or dig into the bin. Dependent on the crop condition and/or the humidity, the sesame at the top may register higher or lower than a truck that is probed.

**Color of the combine**

Any color combine will work in sesame

Any well maintained combine can harvest sesame when set up properly, no matter its color or threshing mechanism, whether conventional or rotary. In terms of a quality harvest, the operator is more important than...
the combine. In 2007, sesame was successfully harvested with a relatively new combine and equally as well with a combine more than 25 years old. Newer model machines are easier or more quickly adjusted to changing conditions to cover more acres with larger headers and capacities. All combines, new or old, should be inspected for sesame leaks and sealed appropriately.

**Header**

Starting at the cutter bar, header height is set according to the lowest capsules expected to be harvested. In most cases, this will be 1 to 1½ ft from the ground. Rarely will the header touch the ground on well grown sesame. Insure proper header height by looking out the side cab window to see that no capsules are left on the lower plant stems.

The most common header used in sesame is the conventional platform header. Auger headers allow the sesame to stand up as it moves across the header and is then pulled in at the center. Draper headers have worked well as long as the center of the header is loaded and cutting sesame. The solution to this problem is to keep the center of the header always loaded and cutting sesame. A circular harvesting pattern can minimize loss by keeping plants flowing over the center belt.

Operators that intend on harvesting many acres of sesame, or those that harvest fields with large plants and high yielding sesame, attach a 3 ft. screen to the back of the header to retain sesame from going over the header. You can monitor the amount of loss from the header in this manner by noting the build up of sesame on the feeder housing without a screen. Header screens have been developed from almost any framing material, while using three foot nylon window screening from a hardware store. If trash builds up on the screen, it can be easily removed by thumping the screen with your hand, a broom, or compressed air gun.

A 3 ft. screen at the back of the header will keep seed and plants from being thrown over the back of the header. Most growers have just designed and built their own screens.

The reel needs to have minimum effect on the sesame. Hume or pickup reels knock off too many capsules. A bat reel should be adjusted to the most extended height up and pulled as far back into the header as can be accomplished. The idea is to lightly touch the top 6 inches of the plants, feeding them into the header if need be. More likely, the reel needs to be set to not touch the sesame plant until the header is under the plant to prevent loss of sesame in front of the header. The reel speed should match ground speed to gently lay the sesame into the header.

In row crops, for best results, the combine header width should match the planter width. It is not recommended to straddle the “guess” row, but rather to cut up to an irregular spacing even if it means cutting with a partial pass to keep even.

For row crop sesame under 5.5 feet and drill sesame, an extendable and adjustable platform header is preferred: JD 200 and 900 series, AGCO Gleaner series 400 Rigid Grain Header (fits series 2R combines, 1992 and up). The apron should be tilted up and sickle bar
should be extended to maximum limits. Headers with short aprons that tilt down are wasteful. Old ‘Maize plates’ work well.

For row crop sesame over 5.5 feet, a JD All-crop Header is preferred, but some of the new rigid headers that allow a higher lifting of the reel work well.

Air headers (or reels) have been used on row crops for any platform header that supports the drive and can lift high enough to work over the top of the crop. Longer drop tubes over the blank rows and spaces improve efficiency. However, all operators to date feel the amount of improvement is not worth the trouble.

Milo guards or flat ‘Britten’ plastic fingers usually hurt more than help.

**Threshing**

Small grain ‘wheat’ combines require very little internal modifications. Good small grain concaves and chaffers usually clean the samples enough to avoid dockage penalties.

Cylinder and rotor speeds are set low to be gentle on the crop (350-400 rpm). Concaves are set equal to corn or beans (½”-1”). As sesame enters the cylinder or rotor, the abrupt change in direction does the majority of the threshing. The immediate direction change force cracks the capsule, releasing the seed. The open concave prevents the sesame from being scuffed or broken. The slow RPM allows the seed to be gently dumped from the capsule.

To simulate the goal of threshing sesame, take a dry sesame capsule, invert it, and twist it between your thumb and forefinger while applying gentle pressure equal to snapping a peanut shell. When the capsule snaps or cracks, all of the sesame will be released without grinding the capsules. First time growers are amazed to see whole capsules exiting the combine without any seed in them. Another goal is to be gentle enough that some of the capsules are not even removed from the plant stems.

Do not install new rasp bars. Slick ones break less sesame. Most of the thrashing is done in the feeder housing.

**Broken Seed**

Take about 50 seeds and look for broken and scuffing. If you have 1 or more broken seeds per 50 seeds, you need to adjust the combine to be more gentle. On the scuffing, count the number of seeds scuffed and multiply by 2 to account for scuffing on the other side of the seed. You should have less than 4 scuffed seeds per 50. Most of the sesame releases out in the feeder housing and there is no reason to be so aggressive that you have more than 1% broken.

**Use your reading glasses or get a hand lens to be sure!**

The four common problems causing broken seed are:
- Seed in the return
- Cylinder running too fast and/or concaves too tight
- Seed in the bin rising above the inlet auger
- High moisture

**Seed Separation**

Cleaning is a delicate process of balancing air force and sieve openings. On conventional machines with a pre-cleaner, the pre-cleaner should be closed. The chaffer is opened to about 1/4 - 3/8 inch, and the sieve is open to 1/8 inch. Many would think that such small seed would require the sieves to be closed. Closed sieves and chaffers reduce airflow. Reduced airflow allows the capsules and plant parts to ride on the sieves with the sesame seed riding on top of them. There needs to be adequate air turbulence to keep the plant material floating above sieves, allowing the sesame to fall through and not ride out the back. Start with having your air set from medium force air and watch to avoid seed in the tailings. Sesame in the tailings will be scuffed or broken.

The best way to gauge if the seed is being blown out the back is to look at the tailings at the end of the field as the combine turns. Within the field, it is difficult to differentiate between what the wind blew out before the harvest, what the header shook out, or what came out the back. Another way is to take a large oil draining pan and toss it under the combine as it passes by.

There will be seed lost out of the tips of the capsules, but with non-dehiscent sesame, the loss is minimal in most conditions. White seeds are very visible on the ground, but to estimate the number of lbs per acre on the ground, mark off an area 1 ft by 1 ft in multiple representative areas and count the seeds. With S32, there are 145,192 seeds per lb. The following table shows the number of seeds in a square foot to lose a specified number of lbs per acre.

<table>
<thead>
<tr>
<th>Seeds per square ft</th>
<th>Lbs/ac lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3</td>
<td>1</td>
</tr>
<tr>
<td>16.7</td>
<td>5</td>
</tr>
<tr>
<td>33.4</td>
<td>10</td>
</tr>
<tr>
<td>166.9</td>
<td>50</td>
</tr>
<tr>
<td>333.7</td>
<td>100</td>
</tr>
</tbody>
</table>

Fixed ‘Airfoil’ chaffers do not work well in sesame. ‘Fine’ Peterson adjustables are great.

A 9/64” or 5/32” punched hole screen provides the cleanest sample. Alfalfa and 1/10” screens are too small for the current varieties of sesame.

**If using a punched hole screen or the hail screen, the screens should be scraped with every combine**
dump. If this is not done, the holes will eventually clog up and yield can be reduced substantially.

**Sesame Residue Management**

Variable speed spreaders are preferred over choppers because choppers disintegrate sesame residue. Larger plant parts are preferred on the surface. Sesame residue has never interfered with good planting as long as it was spread properly.

When using a straw spreader, make sure they are not so aggressive that they fling the stalks into the standing sesame and knock out seed.

**Empty grain bin when seed reaches the height of the auger**

The combine bin should be emptied when the seed reaches the bin auger. The sesame is 50%, oil and the constant churning of the seed pushing up the bin level will damage the seed and lead to price discounts.

Fires

Under some conditions, the trash on the back of the combine will begin to smoke. Of particular concern are places where dust can collect near a hot surface such as a bearing, on the transmission, or near the exhaust where sparks may fly out. Fortunately, it is easy to smell the smoke. When there is a smoke odor, attend to it right away. Most operators just brush it off, but it is easier to just carry a spray bottle (old Windex bottle) filled with water. **Caution: do not use a blow gun to extinguish the smoldering trash, as it may ignite other plant material in the corner and crevices of the combine.**

**Hauling**

Sesame is handled like a grain. The combines can be dumped into grain buggies and later trucks or directly into trucks. When there is broken seed, it is normally from the combine, but there is a potential to damage the seed in the augers of the combine and/or the grain buggy. Samples should be taken in the truck and checked for scuffed and broken.

Grain buggies can be used in sesame to increase the harvested acres per day.

Trucks need to be cleaned for a food crop.

The key is that sesame is a food crop and the trucks should be clean as for any type of food grain. Being a small seed, all seals should be tight. The rule of thumb to use for filling trucks is a test weight of 45 lbs. Most trucks can be filled without exceeding weight limits. The trucks should be tarped to prevent the seed from blowing out while rolling down the road at 70 MPH.

Rule of thumb to use for filling is that field run sesame averages 45 lbs per bushel. Most trucks can be filled without exceeding weight limits. Trucks should be tarped while moving the sesame.
DELIVERY

A sample will be taken when you deliver the sesame. The delivery point will do a rough analysis of the seed in order to determine where to store the seed. This analysis is unofficial. The sample is then split with one sample being sent to an independent third party laboratory for the official analysis. However, the moisture taken at the receiving station is the official moisture used in settlements. The second sample is retained at the delivery facility.

Sesame is handled like a grain when delivered. It will go into pits and into silos.

Sesame does not clean up in a combine as well as wheat, sorghum, or corn. To maximize yield, 6-12% trash is usually left in the crop. Attempts to clean further puts seed out the back and reduces your paycheck. Sesaco pays on marketable seed and penalizes only on excessive trash, weeds, damage, and moisture. The average deduction for the past five years was 9.5%, ranging from 1.7% to 39.2% with 83.1% of the sesame having a deduction of 10% or less.

GRADING

Analysis of the seed received is based on standards approved by the USDA. For many years, sesame was not graded, and the quality was very spotty. The year that grades were introduced, the quality increased significantly, and today most sesame delivered is very good quality. Unlike other crop grading, sesame contracts provide bonuses for better sesame. A large portion of growers get a 1 to 3 cents per pound bonus. Since initiating grading in 1989, every year the average price paid for all seed has been on the bonus side. The intent of the contract is to pay more than contract price and only discount when the sesame increases processing costs.

There are seven measures of quality in sesame, which can easily be attained with the proper settings. The following table shows the combining results for the past 5 years. The good column is the percent of the weight that was better than the contract standard (Std), with the other columns showing the average (Avg), best, and worst. For example, on moisture, 97.8% of the sesame harvested in the last 5 years was within standard and received no deduction.

<table>
<thead>
<tr>
<th></th>
<th>Good</th>
<th>Std</th>
<th>Avg</th>
<th>Best</th>
<th>Worst</th>
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<tr>
<td>Moisture</td>
<td>97.8</td>
<td>&lt;7.0</td>
<td>5.1</td>
<td>2.2</td>
<td>11.0</td>
</tr>
<tr>
<td>Dockage</td>
<td>98.7</td>
<td>&lt;14.0</td>
<td>4.7</td>
<td>0.2</td>
<td>34.6</td>
</tr>
<tr>
<td>Foreign matter</td>
<td>92.0</td>
<td>&lt;2.5</td>
<td>1.5</td>
<td>0.1</td>
<td>29.9</td>
</tr>
<tr>
<td>Broken</td>
<td>97.2</td>
<td>&lt;3.3</td>
<td>1.1</td>
<td>0.1</td>
<td>20.3</td>
</tr>
<tr>
<td>Damaged</td>
<td>94.3</td>
<td>&lt;3.0</td>
<td>1.4</td>
<td>0.1</td>
<td>26.8</td>
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<tr>
<td>Other seed</td>
<td>87.5</td>
<td>&lt;10</td>
<td>8.5</td>
<td>0</td>
<td>292</td>
</tr>
<tr>
<td>Test weight</td>
<td>98.5</td>
<td>&gt;44.0</td>
<td>46.5</td>
<td>50.0</td>
<td>37.4</td>
</tr>
</tbody>
</table>

High moisture is from poor combining. Check and recheck moisture before starting; monitor moisture changes; make sure rest of the field conditions are the same as the test cutting conditions; do not start too early the morning after a good moisture at the end of the previous day; watch for the humidity to rise in the evening; tarp trucks properly – closed in the field during the night and open during the day; stay away from green weeds, particularly careless weed; the base of the plant is the last to dry – raising the header may help.

High dockage is from poor combining. Adjust the air and sieves properly; avoid weedy parts of the field; clean out previous crop especially corn and soybeans. There will be unavoidable higher dockage in sparse fields where the sieves cannot be loaded.

High foreign matter is from poor combining. The major source of foreign matter is from johnsongrass. In some cases, the sesame seed is dry and the moisture comes in on the foreign matter. Avoid harvesting johnsongrass and other weeds; raise the header above field grass; adjust the air and sieves properly; adjust the concaves and cylinder speed to reduce the breaking of the plants.

High broken seed is from poor combining. Check and recheck for broken seed; put on your reading glasses; adjust concaves and cylinder speed; do not let the sesame rise above the inlet auger in the bin; high moisture often leads to high broken. There has been some broken caused by augers in grain buggies and augers used for self-storage prior to delivery. Prior to passing all harvested sesame over these extra steps, recheck for broken.

High damaged seed is from poor combining. Check and recheck for broken seed; plant on time can usually avoid damaged seed. Damaged seed is not the same as broken seed; damaged seed is basically immature seed. The majority of the damaged has been from frosts, as some growers in the past have planted as late as the first week of August. In the past, there was also damaged seed from diseases and insects. A large portion of the damaged seed can be blown out of the back. When looking for
seed that has blown out, disregard damaged seed – a brownish color.

High other seed is usually johnsongrass but also includes kochia and mintweed. The worst load in the table above was 292 johnsongrass seeds in 60 grams of the material that has already passed over screens and air. This is equivalent to 2,209 seeds of johnsongrass in each pound of ‘sesame’ after scalping and probably double that on delivery. Leave johnsongrass areas in the field; one bunch of johnsongrass can have an incredible number of seeds. If the combine is coming from a johnsongrass field, the combine should be cleaned up before entering your field to avoid infesting sesame fields free of johnsongrass. Too many times to count, the grower controls johnsongrass in the sesame field, and the combine brings it in from the sorghum field.

Low test weight is usually from nature – freeze, insects, or diseases. However, high johnsongrass and field grass will also decrease test weights. Note that the test weight done at the receiving facility is usually lower than the laboratory test weight because the latter is taken after the sesame has been put over screens and air. The grading test weight is based on the laboratory test weight.

**FINAL WORDS ON WET SESAME**

Wet sesame is more tender and is easier to damage in terms of breaking seeds, scuffing the seed coat, and releasing free fatty acids. High fatty acids lead to rancidity. High moisture sesame can heat up in trucks and silos and become worthless.

**FINAL WORDS ON HARVEST**

Sesame is not like corn, wheat, or sorghum. It is worth a lot more per pound. This is a food crop where the whole seed will be used. It is not a feed crop, and it will not be ground into flour or crushed for oil. Check and recheck your combine and your trucks regularly and each time you enter new conditions. These tips are not intended to make it seem that sesame is hard to thrash. **Over 500 combines and operators have successfully combined sesame since 1978, and bulk trucks regularly move sesame over 500 miles to the Paris plant without loss.** With some experience, you will find that the "out of condition" standards are very liberal. A large portion of growers get 1-3 cents per lb bonus.

**POST-HARVEST CONSIDERATIONS**

In today’s farming operations with higher input costs, there are two things that growers are paying more attention to: the cost to prepare for the following crop and the synergistic benefits on one crop following another. Many growers realize that much of the benefit of growing sesame comes after the grain is in the bin and looking towards the following crop.

**Sesame Residue**

What makes a good crop residue for both tilled and no-till operations? Sesame is a crop that can benefit both cropping systems. Since the first capsule is 1-2 ft. from the ground, the cutter bar is higher than many crops to leave more residue standing unlike soybeans or guar. Standing sesame residue can capture snow and reduce wind speeds at the soil surface, which will reduce evaporation from the soil. The standing stalks are very brittle, break over easily, and do not ball-up or interfere with planting or tilling equipment.

Many growers agree that sesame has just the right amount of residue: not too much and not too little: the “right kind.” The “right kind” comes from the residue not interfering with disks cutting into the soil and not building up to prevent uniform seeding depths.

The combination of standing sesame stalks and evenly spread chaff thoroughly protect the soil surface. As this residue ages, it may turn to a lighter almost white color that reflects solar radiation. Reduced radiation increases surface moisture persistence and buffers soil temperature extremes to promote soil microbes.

![This picture of residue was taken 2 months after harvest in Enid, OK. Note that the grower cut high but below the first capsules to leave as much stalk as possible.](image)

Surface residues are only half of the story: while the surface residue protects the soil from the elements above ground, large amounts of root biomass underground decay and support beneficial soil microbes. The deep penetrating roots hold soil aggregates in place and increase infiltration of rainfall in combination with surface residue.
This grower is reshaping beds directly behind harvesting fall sesame in December to prepare for immediate spring corn planting in the Lower Rio Grande Valley. Note this field is cut lower to facilitate incorporating the stalks into the soil.

**Late Season Stored Moisture**

Another reason sesame is expanding acres is the hidden benefit sesame has over other crops for protecting late season moisture for the following crop. Beginning in the late reproductive phase and continuing through the ripening phase, sesame self-defoliates and gets rid of most of its transpiration surfaces. Unlike sorghum that is a perennial and continues to pull moisture from the soil until a freeze, during the last 30 days of drydown of sesame, soil water use is minimal. The plant has naturally gone into drydown and transpiration is minimal. Rainfall that occurs traditionally in September/October is stored moisture for the fall planted, cool season crops, when planting directly behind the combine or when double cropping in South Texas back to other crops.

**Effects on Cotton Root Rot**

Growers in Arizona and Texas have reported that cotton following sesame has significantly less cotton root rot (*Phymatotrichopsis omnivora*) the following year.

**Effects on Nematodes**

Researchers at Texas A&M and Auburn University have found that sesame reduces root-knot nematode populations that attack peanuts and cotton.

Sesame has a deep tap root, which produces a natural biocide that suppresses most nematodes. Growers have noted a suppression of nematode populations in rotational crops such as cotton, peanuts and other crops. Research shows that sesame may be an effective rotation crop to control peanut root knot nematode (*Meloidogyne arenaria*) and southern root knot nematode (*M. incognita*). Sesame rotation is not effective, however, for the Javanese root knot nematode (*M. javanica*). (Starr and Black, 1995)

Growers in Alabama have added sesame into rotation with cotton, peanuts, and soybeans. Nematode levels are reduced and yields significantly increased among those crops in fields previously planted in sesame. (Anon, 1997)

**Soil Improvements After Sesame**

- Sesame is an excellent soil builder. Roots have as much mass as the visible plant. Stalks disk into soil easily and break down quickly. Soil is very mellow and requires little work for next crop. Many growers have done one light disking and planted wheat. Tillth and moisture retention is improved.
- Growers walking across split planted fields can feel under their boots how much more mellow the ground is after sesame.
- Growers ripping diagonally across fields with cotton, sesame, and sorghum, have been able to operate one gear higher on the sesame ground.
- Growers listing across pivots have to raise the lister when on sesame ground.
- In high erosion areas, ground after sesame does not blow as much as many crops.
- Growers report that after sesame, the soil retains moisture better for planting the next crop.
- In dry years after sesame, in split planted fields, corn and cotton do not show as much stress after sesame. The soil retains moisture better.

**Cotton After Sesame**

Many growers have incorporated sesame into their cotton rotation because it increases yield; suppresses populations of root knot nematodes; is not susceptible to cotton root rot; and extends limited water so that they can concentrate their water for cotton.

With early warm weather or delayed planting date, sesame can volunteer in cotton. Growers easily control sesame in Roundup Ready and Liberty Link cotton. Sesame is extremely susceptible to glyphosate and glufosinate. In most years, the sesame will not come through prometryn (Caparol). If sesame survives in the cotton, the cotton grade has never been affected and volunteers have rarely bothered pickers or strippers.

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Sesame harvest guide                                                                                                                           13

**Peanuts After Sesame**

Many growers have incorporated sesame into their peanut rotation because it increases yield; suppresses populations of root knot nematodes; and extends limited water so that grower can concentrate water for peanuts. Sesame can volunteer in peanuts. Imazapic (Cadre) and 2-4D provide effective control. Some growers prefer a wiper with glyphosate.

**Wheat After Sesame**

Many growers have incorporated sesame into their wheat rotation because it increases yield and provides a second cash crop.

Sesame ahead of wheat will use resources - moisture and fertility. In dryland conditions in a dry year, there may not be enough moisture for both crops. No additional total fertilizer is necessary for wheat, but wheat will need more up-front nitrogen (10-20 units/ac), since the breaking down of the sesame stalks will tie up a bit of the nitrogen early.

In Northern Oklahoma, sesame will push wheat planting into November or December and will not work for grazing wheat. In South Texas, planting rye for grazing after sesame has increased the number of days the cattle can stay on the field and has increased daily weight gain.

**Sesame After Sesame**

When sesame was first introduced into South Texas in 1987, there were problems with sesame after sesame in a build up of root rots (Fusarium, Macrophomina, and Phytophthora). Growers found that by rotating sesame back after two years, there were minimal problems. Although the newer varieties have much improved root rot tolerance, there is no recent experience coming back the following year with sesame.

One major consideration is that sesame mines the fertility that is deep in the soil, but once that fertility is mined, additional fertility must be applied to achieve similar yields to the first year.

**THINKING AHEAD**

At harvest, growers need to be thinking ahead where to plant their sesame the following year. Every area and every farm is different in terms of soils and weather conditions. It is impossible to make general recommendations that will work for every farm in selecting fields to plant sesame the next year. With the exception of planting after failed crops, growers seldom plant their sesame on their best ground at the optimum time for planting. The optimum of planting is as close as possible to when the soil temperatures reach 70º F. The best soils for sesame are medium well-drained fields. Sesame does not like standing water or saturated soils.

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Sesame and cotton are good rotations

Sesame does not like saturated soils. This field is furrow irrigated, and there was a leak on the sesame on the left beds leaving the soil saturated during the three days of irrigation. On the right the sesame had normal irrigation. The sesame on the left matured sooner with substantially fewer capsules. In lake areas, the water will kill the sesame.

After harvest is the time to think how to incorporate sesame into a rotation that will increase net profits and reduce the risk in high input crops. Growers need to know how sesame will do in their better ground planted at the optimum time so that they really understand their options.

By law in the new Farm Bill, the process has started to develop an APH crop insurance program. This is the time for growers to start developing their own APH instead of relying on T-yields.
APPENDIX 1 - INITIAL COMBINE SETTINGS

General comments
Sesame is 50% oil and can be easily damaged releasing free fatty acids and turning the seed rancid. Combine settings should be as slow and gentle as possible while still moving the crop through and the air as high as possible without blowing seed out the back. Sesame uses slower cylinder speeds and wider opened concaves than comparable crops. There are often price discounts from broken seeds when combines come in to a sesame field from other crops without adjusting the settings.

Never open the concave all the way because plugs will take a long time to remove.

Sesame needs to be less than 6% moisture. As the sun sets, the seed will begin picking up moisture in humid areas, and the field will not be ready to combine again until later the next day.

Clean the combines before starting – wet or spoiled seed can ruin a truckload of sesame!!!! If it rains between cuttings, reclean the combine. Sesame is food grade. Even if it has not rained, dew can collect and go to the auger and start to spoil the sesame that the auger does not clean out.

Like other small seeds, sesame does not clean up in a combine as well as wheat, sorghum, or corn. Expect 5-10% deduction from the gross weight.

JD 95/96 series:
- Cylinder rpm: 400
- Concave: open to corn
- Air: 750
- Top sieve (wheat): barely open
- Combination sieve: completely closed
- Bottom sieve: completely closed
A JD9650 in 2007 had premiums with:
- Cylinder rpm: 400
- Concave setting at 33
- Air: 750
- Chaffer set at 10
- Sieve set at 0

IHC 1680:
- Cylinder rpm: 350
- Air: 450
- Fine grain concave (wires in)
- Skirts/blockers out
- Transport vanes – fast exit of crop
- Set for very easy thrash
- Good reports of avoiding fine trash problems by enclosing cage with ‘cage skirts’

AGCO R65:
- Cylinder 375
- Concave clearance: 1”
- Air set on 1
- Chaffer: 1/4 to 3/8 open
- Sieve: Closed

Other conventional combines:
- Feeder housing chain adjusted fast and close
- Concave adjusted for ‘corn’
- Cylinder at slowest RPM
- Air at minimum - but not disconnected
- Top sieve open 3/8” (width of a pencil)
- Bottom sieve closed

Test cutting
- Ground speed needs to be fast enough to load the sieves.
  - 3-4 MPH in heavy crops (irrigated)
  - 4-7 MPH in light crops (dryland)
- Adjust ground speed to help bring the crop into the header.
- Bring concaves in towards ‘soy’ only enough to remove mature seed from capsules. No settings will remove 100% of the seeds from the capsules. There can be capsule deformities that will not allow the seed to flow out. There are 70 seeds per capsule; open 50 capsules without deformities and there are usually 0 to 10 seeds left in - 0 to 0.3%.
- Partial stalks with many capsules still attached are normally seen coming off the straw walkers.
- The cylinder speed is only increased if problems in feeding occur in the smaller machines.
- Increase the air until seed starts coming out the back and then lower just a bit.
- Recheck seed return to insure there is no seed.
- Like with other crops, cut a small sample and test for moisture.
- Check for broken seed – should be less than 1 seed in 50 broken. If more, slow down cylinder and/or open concave.
- Empty combine bin before it reaches the auger. The auger will churn the seed and cause damage. Churning is a major cause of deductions in grades.
- At times, the sieves will not close because there is a sorghum or corn stalk caught in the sieve. Open sieves lead to trashier sesame and can lead to price discounts.
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