2006 SOUTHWEST SESAME GROWER'S PAMPHLET

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QUICK FACTS

Benefits of growing Sesame
- More profitable with limited resources than other crops using the same resources.
- Offers more return for less cost (less risk) than other crops.
- Sesame is very drought and insect resistant.
- Sesame suppresses the root-knot nematode and cotton root rot for the following crop.
- Sesame increases moisture retention and soil tilth, and the following crops have increased yields with reduced production costs.
- Sesame has negligible economic damage from deer, hogs, and birds.

Planting time
- Earliest time is when there is 70ºF soil temperature.
- Latest time is 4th of July.

Soil requirements
- Grows best on medium to light, well-drained soils.
- Prefers pH 5-8.
- Does not tolerate salinity

Land preparation
- Good land preparation is essential for a good stand since seed is small.
- Have planted with row planters and drills
- Row spacing from 15" to 40".

Variety selection. See Appendix 1.

Uvalde TX area: a. S26 for dryland b. S26 for planting prior to 1 Jun c. S28 for planting in Jun/Jul
San Angelo TX area: S29
Jones/Haskell TX area: S26
Gainsville, TX area: S26
Caprock TX (farmer preference): a. S29 Primary variety b. S25 Secondary variety
Oklahoma: S25
Kansas: S25

Planting. See Appendix 2 for equipment.
- Should be planted in firm, moist ground with 0.75 to 1.5" loose, mixed wet/dry dirt above.
- Almost zero success with watering up.
- If drought followed by planting rain, make sure that the top moisture has joined the bottom moisture. No root will push through dry dirt.
- Needs moisture around seed 3 days (late planting/warmer) to 5 days (early planting/cooler).
- Do not fill boxes above 6-8" because will grind seed.

Planting rates
- Between 2.5 to 4.5 lbs/ac depending on row spacing and planting conditions. First time growers should strive for 3 to 3.5 lbs/ac.
- Good starting point: 25 to 35 seeds per foot.

Fertilization
- The best sesame yields are on fields that are fertilized with balanced NPK fertilizers.
- Sesame is deep rooted and will scavenge for fertility below most crops roots zones, but that only works once.
- If possible apply half at start of flowering. Uses N primarily during flowering.

Dryland under 28" annual rain	25-35 units of N
Dryland over 27" annual rain	30-60 units of N
Full irrigation (12")	60-80 units of N
Semi-irrigation (6-8")	40-60 units of N
Semi-irrigation (2-4")	30-50 units of N

Cultivation
- 3-4 weeks after planting.
- Can throw soil up on stem.

Irrigation
- Uses less water than cotton, corn, sorghum, soybeans, or peanuts.
- Sesame is one of the most drought tolerant crops in the world, but will give higher yields with irrigation.
- A heavy pre-irrigation is the best water the sesame will get.
- Prefers fast light irrigations. Too much water kills sesame. Sesame cannot survive standing water.
- First irrigation 28-35 days after planting. Time for next irrigation when plants wilt about 2:00 PM. Last irrigation when flowering is cutting out.

Disease and insects
- Basically, no problems in the growing area with present varieties.

Harvest. See Appendix 3.
- Sesame will dry down 120-150 days without a frost. It will dry down sooner with a frost or freeze.
- Most combines do an excellent job when set up properly. The operator is more important than the combine.
- Most combines use a platform header but a row crop header can be used.
- Seed is 50% oil. Needs to be below 6% moisture (equivalent to 12% corn).
- Can damage seed by filling combine bin above auger.

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The pamphlet has been modified to take detail out of the first part of the document and place them in appendices. This allows readers to get a quick overview of growing sesame by reading the first 8 pages without being bogged down in details.

CHARACTERISTICS OF SESAME

99% of the sesame grown in the world is harvested manually because the capsules shatter when they dry down. In using these lines for US direct harvest, 60 to 90% of the seed ends up on the ground.

Only Sesaco has developed non-dehiscent sesame varieties for direct combine harvest (US patent number 6,100,452). These varieties can be left to dry in the field and will retain the majority of the seed until combined. In the combine with proper settings, the capsules will release the seed with minimal damage.

Sesame (*Sesamum indicum*) is a broadleaf summer crop like cotton, soybeans, black-eyed peas, mung beans, or guar.

Planted early under high moisture/fertility conditions, plant can reach 4-6 feet in height. In dryland conditions, it is generally 3-5 feet, depending on rain.

Some varieties are single stemmed and others have branches. Some varieties have a single capsule per leaf axil and others have triple capsules. Branched, single capsule varieties are best adapted to the present growing areas.

Plant is very leafy, but self-defoliates at maturity.

Flowers start about 36-45 days after planting and stop 70-90 days after planting.

Seed is produced in capsules with about 70 seeds per capsule. First capsule is 1-2 ft from ground.

Physiological maturity normally occurs 90-110 days after planting depending on varieties, moisture, fertility, and temperatures. Sesame normally dries down in 130-160 days. In most of Texas, sesame dries down before frost.

Frosts can move the plants to drydown ahead of normal. Can harvest direct after a frost like cotton and sorghum.

REASONS TO GROW SESAME

Sesame is a program crop. Sesame can be planted on cotton (or other program crop) acres and still receive the cotton direct payment. A sesame base can be established for a direct payment for sesame.

Sesame is very drought and insect resistant!

Rule of thumb: sesame uses 1/2 water of cotton, 1/3 water of sorghum, and 1/4 water of corn.

In areas with limited water, farmers stretch their water by planting half the pivot in sesame and the other half in cotton or peanuts.
Sesame is adapted to cotton growing areas.

Generally sesame offers more return for less cost (less risk) than most other crop options.

Many farmers have reported increases in yield in corn, cotton, peanuts, soybeans, wheat, and sorghum following sesame.

Sesame suppresses the root-knot nematode and cotton root rot.

GROWING AREA

There are two types of sesame, and they are mutually exclusive: (1) sesame for dry, arid areas and (2) sesame for wet, humid areas. Dry, arid sesame will get many diseases in wet areas, and wet, humid sesame will do poorly in dry conditions. Sesaco varieties were developed for dry, arid areas.

Present Sesaco sesame varieties are adapted to the following area:

- South boundary: 50 miles south of San Antonio, Texas
- East boundary: 50 miles east of Interstate 35 through San Antonio, Dallas, Oklahoma City, and Wichita, Kansas.
- North boundary: within 50 miles just over the southern border of Kansas
- West boundary: areas below 4,000 ft MSL to the New Mexico border.

Historically, sesame is susceptible to leaf diseases east of I35 to the Atlantic Coast.

There is not a long enough growing season north of southern Kansas.

Sesaco sesame is grown in Arizona.

TEMPERATURE REQUIREMENTS

Sesame needs 70°F soil temperature to plant. Take the temperature in the morning at intended planting depth. Watch for cold front or rain, which will take temperature down again.

Early planted sesame generally gives the best yields and the fewest pest problems!!! However, planting too early can reduce yields because the seedlings will grow slowly in the cold weather. Rule of thumb is "if you have to wear a jacket in the morning, it is too cold to plant."

Planting in South Texas is usually from mid April, in Rolling Plains and central Oklahoma from mid May, and in Caprock and northwest Oklahoma from late May. Warmer years like 2000 allow for earlier planting. Watch the temperatures, not the date.

Volunteer sesame can fool you in that it can germinate during a warm spell in March from shallow depths, which are much warmer than planting depths.

Since 1987 in Texas and Oklahoma, sesame planted before 15 June has escaped problems with early frosts in all years and before 1 July in most years. Last planting date should be by 4th of July. After that date yields and seed quality are at risk. In South Texas with no frost issues, last planting date should be by 15 June because of wet falls with high humidity.

From planting, need about 110 days of night temperatures over 40°F.

Harvest from late September through December depending on planting date, variety, and weather.

Will terminate and self-defoliate without a frost.

Needs to reach physiological maturity prior to frost to make optimum yield.

SOIL REQUIREMENTS

Grows best on medium to light, well-drained soil. Heavy clay soils require good drainage or beds and light irrigation.

Prefers slightly acid to alkaline (pH 5-8), moderate fertility.

Does not like salt. Less salt tolerant than cotton or alfalfa.

LAND PREPARATION

Good land preparation is essential for a good stand since the seed is small.

Needs to be planted into good moisture with loose, dry cover.

Just prior to planting, recommend shallow mulching operation to:

- Get rid of weeds
- Seal in the moisture

Do not plant into dry soil and wait for rain!!

When it does rain after a dry period make sure that the top moisture has joined the bottom moisture. There is no crop where the root will grow through a layer of dry soil.

Almost no success with watering up. There are soil cooling, weed emergence, crusting, soil compaction, and herbicide problems.

Sesame is a deep-rooted crop. Hardpans will reduce yields.

Row versus drill planting

Both row planters and modern drills can achieve a good stand as long as there is good soil moisture, good preparation, and proper seed placement.

Most sesame planting in cotton areas has been done with row crop planters. Most sesame planting in wheat areas has been done with drills with depth control and small seed attachments.

Advantages of row crop planting:

- Cultivation for weed control.
- Easier for planters to get to moisture and still have light, dry cover.

Advantages of drill planting:

- Leaf canopy closes in faster helping with weed control.
- Wide modern drills can cover many acres quicker.

Drills have been used as row planters in cases where cultivation is desired. Drills have been used on beds.

Row crop spacing

Beds are preferred for row planters; easier to plant into moisture and keeps water off stems.

Optimum row spacing: 20” to 40”. Closer spacing for irrigation or high rainfall areas and wider spacing for dry areas. Double row beds have been the best for yield.

Skip row patterns increase row acre yields, but solid plantings are best for gross acre yields, except in very dry years. 8 and 1 patterns will result in larger plants next to the skip, which will mature later. However, 8 and 1 40” pattern allows for combine header width to equal planter pass width to minimize “guess” row problems at harvest.

Drill spacing

Optimum row spacing: 15” (for late planting) to 22” (for early planting). Presently, there are no varieties suitable for 6-8" spacing.
In a low rainfall area or dry year, increase the row spacing to as much as 30".

If cultivation is an option, 20"+ spacing necessary.

PLANTING

For choosing a variety, refer to Appendix 1.
For planting equipment and plates, refer to Appendix 2.

Planting is the most critical aspect of growing. A farmer can do nothing to improve yield on poor stands except replant.

***** Desired result - plant seed on a firm moist seedbed with loose, dry dirt on top. *****

Good moisture (as good or better than cotton) is best insurance. If there has been a drought followed by a planting rain, make sure that the top moisture has joined the bottom moisture. No root will push through dry soil.

Seed is small and has much less push than cotton, peanuts, wheat, sorghum, soybeans or mung beans. Usually should have less cover and compaction than other crops.

Should be planted in firm, moist ground with 0.75 to 1.5” loose, mixed wet/dry dirt above. Should be planted shallower than most any other crop except alfalfa.

Needs moisture around seed 3 days (late planting/warmer) to 5 days (early planting/cooler).

Slow down the planter in order to get uniform seed depth. Seed is light and will bounce to different depths.

Do not fill planter boxes above 6-8" to avoid grinding the delicate seed.

Put in same volume of seed in each planter box to enable detection of a box planting too much or too little.

Lift off packer wheels from planting line or put as little pressure on as possible.

Pushing too much dirt off the seed line and ending up in a furrow makes the seedling susceptible to being covered in heavy rains.
Sesame seeds are too weak to break through most crusts - depends on cracking. Scratching sometimes helps if timing is right. Best scratching done with a rotary hoe with teeth reversed running over the row ***slowly***.

No-till planting has been successful in Oklahoma. The wheat stubble should be mowed to less than 4 inches to prevent shading of the seedlings.

For tractors equipped with liquid dispensers, placing 10-50 gallons per acre of water in the seed line helps insure uniform emergence in irregular soils. Allows shallower seed placement. Highly recommended for most dryland farming.

Planting rates

Most farmers plant between 2.5 to 4.5 lbs/ac depending on row spacing and planting conditions.

Cheapest insurance for sesame: plant enough seed the first time. Over-seeding is much better than under-seeding.

Sesame adjusts to the population. If the population is too high it will self-thin itself in most situations. In low populations, it will branch more to fill the spaces. There have been no statistical differences in yield between 3-8 plants per foot at harvest in studies on 30", 36", 38", and 40" row spacing. ***Seed per foot of planted row is more important to yield than population per acre.***

Planters are different and can be set differently; soil compositions are different; soil moistures and temperatures are different; as with all crops every farmer does something a little different. The following is a starting point for new farmers.

For average conditions, plant 25-35 seeds/ft. ***Seeds are small; together, they help to push up soil and emerge. Planting less seed/ft usually ends up in skips***. Expect emergence of 11 to 19 seedlings/ft., and expect harvest population of 5-10 plants/ft.

Plant more (30-40 seeds/ft) when planting
- Deeper
- Under compaction
- In cloddy, trashy soil
- In cooler temperatures
- In less than good moisture
- When soil changes within field
- In fields with hills and low spots

Plant less (20-30 seeds/ft) when planted
- In well prepared soil with good moisture
- With no herbicides
- When soil temperatures reach 80 degrees

For S26 and S28, the following table shows the number of lbs/ac planted depending on number of seeds/ft and row spacing, e.g., planting 30 seeds/ft on 30" rows, will use about 3.7 lbs/ac. Note that the greater the number of seeds/ft planted, the higher the emergence percentage.

Row space	**Seeds per ft planted**					
	15	**20**	**25**	**30**	**35**	**40**
40"	1.4	1.8	2.3	2.7	3.2	3.7
36"	1.5	2.1	2.6	3.1	3.6	4.1
30"	1.8	2.5	3.1	3.7	4.3	4.9
22"	2.5	3.3	4.2	5.0	5.8	6.7
15"	3.7	4.9	6.1	7.3	8.6	9.8
	5	**8**	**11**	**15**	**19**	**24**
	Seeds per ft normally emerged					

To calibrate planter:
- Measure the drive wheel.
- Catch seeds under one dispenser for one full revolution of drive wheel.
- Count seed and divide by wheel measurement.
- Calibrate as required and repeat.
- Before starting, catch seed under each dispenser to check for same relative amount.
- In loose or sandy soil, drive wheel will slip and seeds per foot should be increased.

As soon as feasible, determine number of lbs per acre being planted to insure that calibration is correct. Wheels can slip depending on soils.

One common error: not checking seed depth for all planter rows.

Check planting depth and moisture as field conditions change.

WEED CONTROL

Keep fields as clean as possible of johnsongrass, mintweed, wild cucumber, sunflower, kochia, and ground cherry. These are difficult to clean out of sesame. Sesame delivered with these seeds is subject to discounts on the price.

There are no herbicides yet labeled for sesame. Sesame has followed many failed out crops that had herbicides applied. The following research has been done on sesame and provides a guide to the herbicides that are tolerated and not tolerated.

International research as well as initial work done in Arizona and Texas has shown that sesame tolerates Fusilade®, Poast®, Dual®, Stomp®, Verdict®, Sertin®, some Prowl®/Treflan® (1/2 of low end of cotton rate - no greater than 1 pint per acre), and Staple®.

Presently, there are field and lab residue studies through the IR-4 program to establish a tolerance for Dual® and Select®. However, these chemicals are not registered and should not be applied until cleared by the US EPA.

Texas A&M selected Dual® as the soil-applied herbicide for the IR-4 program since it has controlled small-seeded annual grasses and broadleaf weeds in research plots at 1.5 to 2.0 pounds (ai) per acre (post-plant, pre-emerge) without damaging the sesame.

Select® was found very effective on several annual and perennial grasses (such as johnsongrass). Select® was more effective at lower rates than Fusilade® or Poast® and therefore was selected for the IR-4 program. However, there have been mixed results with Select®. With the recent high usage of Roundup Ready® crops, the tanks are building up residues. Herbicides such as Select® free up the residues and the Roundup® damages the sesame.

Herbicide trials conducted by Texas A&M at Yoakum showed that reduced rates of Treflan® and Prowl® controlled weeds when incorporated lightly at planting. However, when they were incorporated to normal depths in soil for peanut or cotton production, severe stand reductions were noted in sesame.

Banding Prowl®/Treflan® over the seed line has never worked, probably because the seed is close to the surface and absorbs the herbicide.

Sesame is more sensitive to herbicide bands in cool or wet weather.

Sesame **does not** tolerate Caparol®, Pursuit®, Roundup®, Cadre®, 2,4-D, Atrazine®, Paraquat, Valor® etc. Farmers spraying Roundup® or 2,4-D in adjacent crops to the sesame may get severe sesame damage from drift.

Using Roundup® with hooded sprayers has worked in lieu of cultivation with the side nozzles turned off. Initial experiments with Roundup®, Blazer®, Direx®, Valor®, and Caparol® with the side nozzles on has worked, but there has been complete kill with the Roundup® when the tractor has stopped. Further research will be done in 2006 on timings of applications and height of spraying on the plant.

There are no herbicides yet labeled for sesame.

Use of herbicides on previous crops.

Following hailed out cotton, sesame has been planted after Staple®, Direx®, Treflan®, and Prowl®. There have been mixed results after Caparol® with successful farmers planting below the Caparol® band.

In some years sesame can follow Cadre® in peanuts, but in dry years there have been carryover effects on sesame.

There have been mixed results with wheat herbicides such as Amber®, Glean®, Ally®, Finesse®, and Assert®. Some farmers have planted sesame after using these herbicides with results ranging from little effect to complete eradication of sesame.

Be careful with newer, longer residual herbicides in your previous crops - if cotton is not OK on the label, don't try it for sesame.

FERTILIZATION

The best sesame yields are on fields that are fertilized with balanced NPK fertilizers!! Anhydrous ammonia applied the previous year for the wheat is not going to be enough.

Sesame is deep rooted and will scavenge for fertility below the wheat root zone, but that only works once. The sesame will strip that lower reserve, and the N will not be available for future sesame crops.

Varies with soils, rainfall patterns, and local farming practices.

Use slow releasing fertilizer. There have been mixed results with anhydrous ammonia.

Uses N primarily during flowering.

Dryland under 28" annual rainfall	25-35 units of N
Dryland over 27" annual rainfall	30-60 units of N
Full irrigation (12")	60-80 units of N
Semi-irrigation (6-8")	40-60 units of N
Semi-irrigation (2-4")	30-50 units of N

Can be applied and incorporated pre-plant, but do not apply over 50 units of N as a pre-plant. Plants will look beautiful, but may not yield as much - behaves like cotton.

Using 10-20 units pre-plant with the balance side-dressed about 3-4 weeks works best.
In pivots, use 10-20 units pre-plant with the balance in the first two irrigations.

If wheat stubble is burned off, use recommendations above. If wheat is disked in, use 20-40 units pre-plant because the stubble ties up the N.

PK as required by cotton. Work has shown that PK is critical for high yields, particularly in acidic soils.

Do not plant fertilizer in the seed line with the seed! The fertilizer will disintegrate the seed.

Sesame seed contains about 25% protein, and it is estimated that one ton of sesame seed contains 35 to 42 lbs of N. The plants (without the seed) on a one ton crop per acre will have about 60 lbs of N, which will go back into the soil at harvest.

CULTIVATION

Cultivate sesame at 3-4 weeks after planting before it gets too tall.

If plants look yellow from cold or too much rain, cultivation will help green up sesame.

Roots follow moisture. If rain/pivot in first few weeks after planting, roots will grow laterally so should not cultivate close to plant.

Sesame tolerates throwing dirt up on the stalks - helps control small weeds coming in seed line and deepens irrigation furrow.

Two cultivations preferable - one before and one after first irrigation.
Can cultivate when sesame is a little taller than tractor axle, but should be done in afternoon if flowering.

IRRIGATION

Uses less water than cotton, corn, sorghum, soybeans or peanuts. ***Stretch your limited water with sesame!***

Sesame is one of the most drought tolerant crops in the world, but will give higher yields with irrigation.

Yields are based on total amount of water in the soil profile before planting, the rainfall between planting and physiological maturity, and the irrigations.

Late irrigations are better than no irrigations, but will not yield as much as timely irrigations. Many farmers do not irrigate until finished with watering corn, cotton, and/or peanuts. If irrigating late, call Sesaco and discuss whether late irrigation is worthwhile – the answer will depend on preplant soil moisture profile, row spacing, population, rains, and previous irrigations.

A heavy pre-irrigation is the best water the sesame will get. The moisture profile at planting time is the determinant of post-plant irrigations. If there is a poor profile, more water will be necessary.

Going into a low moisture soil profile with a light pivot irrigation to get the sesame up and then trying to keep up with the moisture requirements has not worked. Sesame likes to root deeply after moisture. Maintaining moisture at the top will make the roots lazy and not go deep. With shallow roots, both extremes are deadly: letting the soil around the roots dry out or adding so much water that the roots suffocate and the plants die.

If the plants start with high fertility/moisture, they will need an irrigation within 28-35 days of planting. If stressed too much, will lose leaves and late/full irrigation will not give highest yields. If plants start with low fertility/moisture, some irrigation will help, but full irrigation is not cost effective.

Look to the plant to tell you when to water. Do not worry if plants droop in hot afternoon. When the leaves wilt by 2:00 PM, the plants will need water soon. Do not pay attention to top moisture; the taller the plants, the deeper they draw their moisture.

For furrow irrigation:
- Prefers fast, light irrigations. A short run or some slope helps.
- On pre-irrigation, block the ends and stack up the water. On other irrigations let water drain out of end.
- With pre-irrigation and no rain, first irrigation at 4-5 weeks, with 1-2 more irrigations 10-16 days apart.

- Watering every other row has worked with good beds.
- 2.0 or more inches of rain at right interval are a substitute for an irrigation.

For pivot irrigation:
- On pre-irrigation, apply 2 to 4 inches depending on amount of moisture in soil profile.
- With pre-irrigation and no rain, first irrigation at 4-5 weeks, with 2-3 more irrigations 7-12 days apart.
- Use 1 to 1.5 inches per application.
- 1.5 or more inches of rain at right interval are a substitute for an irrigation.

Number of irrigations and interval depend on soil. Lighter soil needs earlier and more irrigations.

Stop irrigating when 50% of the plants have stopped flowering (70-80 days dependent on variety).

Watering up or watering back to help a poor stand seldom works and brings on weeds.

Three options: (1) go dryland, (2) go fully irrigated, (3) go semi-irrigated: pre-irrigation and 1 irrigation at 6-7 weeks. In many areas with scarce water, option (3) has been the best strategy.

Under-irrigation is much better than over-irrigation.

Do not try first irrigation after 6 weeks, unless (1) preceded by good rains, (2) very low pivot rates are used (less than 0.5"), or (3) first irrigation is also the last.

DISEASES

Through plant breeding, present varieties have incorporated tolerance to all diseases encountered since 1978.

Sesame is not susceptible to cotton root rot (*Phymatotrichum omnivoum*), and cotton is not susceptible to sesame root rots.

Sesame root rots (combination of *Phytophtora parasitica*, *Fusarium oxysporum*, and *Macrophomina phaseolina*) have been encountered mostly on fields where sesame is planted after sesame. The current varieties are tolerant of the root rots. The best way to avoid sesame root rot is to rotate each year.

Rhizoctonia, *Helmintosporium*, *Thielaviopsis*, *Verticillium*, *Alternaria*, *Cercoseptoria*, *Cercospora*, *Pseudomonas*, *Cornespora*, and *Leveillula* have been reported in sesame in the US in research nurseries, but have not been seen in commercial fields since 1978.

An unidentified leaf disease (probably *Pseudomonas*) has appeared in several years when there are cloudy damp cool days, but the plants have grown out of the problem when sunny days return, and there has been no economic damage.

INSECTS

Through plant breeding, present varieties have incorporated tolerance to all insects encountered since 1978.

Since 1978, less than 5 fields have been destroyed by insects and less than 10 have had significant economic damage. All of these problems occurred prior to 1994 and were on fields planted late.

Normally, the beneficial populations of insects control the few insects seen. With less spraying on cotton because of the boll weevil eradication program, the populations of beneficial insects have increased.

Sesame is not susceptible to the cotton aphid.

In 1995 in the Rolling Plains the army worm (*Cupis unipuncta*) did not attack the sesame where cotton and alfalfa were devastated next to sesame fields.

In 1995 in the Rolling Plains the cabbage loopers (*Pieris rapae*) did not move into the sesame although loopers have done some damage in the San Angelo area in previous varieties.

In the Uvalde area, late planted sesame (after 1 June) is susceptible to the silverleaf white fly (*Bemisia argentifolii*) in a hot dry year. Rains appear to suppress the white fly. Newer varieties have more tolerance to white flies. In 2000 there was very limited white fly damage in Uvalde in a year with very high white fly populations. Further north from Uvalde, the white fly populations have never built up to pose a significant economic threat to sesame.

Previous varieties of late planted sesame were susceptible to the green peach aphid (*Myzus persicae*) – the major aphid in pecan groves. No economic damage from aphids has been seen in sesame since 1992.

Bollworms (*Heliocoverpa zea*) and garden webworms (*Achyra rantalis*) have been seen in sesame but damage has never reached an economic level. Grasshoppers (*Trichoplusia ni*) can damage the edges of the fields near pastures in dry years.
Most pesticides are not labeled for sesame. Bt (Bacillus thuringiensis) and neem (Axadirachtin) are cleared for use on sesame.

HARVEST OVERVIEW

The following is an overview of harvest – for more details refer to Appendix 3.

Sesame is self-defoliating.

No harvest aids are labeled for sesame. Preliminary work with Texas A&M has shown that harvest aids may become a useful tool. Initial experiments showed that applying the harvest aid prior to full maturity – seed in capsules off (about 10 days after physiological maturity) can lower yields by as much as 10%.

Best yields are on sesame harvested on time. Be ready!!!

Sesame is ready when crop dries above where it will be cut.

Sesame will dry down in 120-150 days without a frost. It will dry down sooner with a frost or freeze.

After a freeze on a green plant, within a couple of days the plants will be brown, but it generally takes 5-8 days to dry down enough for combining.

Harvest equipment

Most combines can do an excellent job ***when set up properly***. The operator is more important than the combine.

Broadcast headers can work efficiently for most of the conditions.

For tall (6 ft or over) or lodged crops a JD #50 series all crop header is recommended, but some of the newer reels can handle larger crops.

Small grain sieves usually clean well enough for good seed grades. On the newer combines, combinations work well.

Combining

For best yields, sesame must be harvested as soon as crop moisture falls below 6%. ***Moisture is critical; must be below 6%.*** (Equivalent of 12% corn).

Be gentle with combine settings, as seed is 50% oil. Most problems with over-thrashing are from using harsher setups from other crops or from re-thrashing seed in the return.

Slow down the cylinder and use loose concaves. Grades are affected by broken seed. ***Before releasing combine, count broken seed in 50 seeds and keep below 1 per 50.***

Continue to check for moisture and broken seed, particularly when changing fields.

Like other small seeds, sesame does not clean up in a combine as well as wheat, sorghum, or corn. Normally expect about 10% deduction from gross weight. Keep seed out of the return.

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***.

Clean all harvest machinery and trucks for food crop.

Protect seed from rain and dew in combine and trucks. Wet sesame can heat up faster than most other seed.

CROP INSURANCE

There is presently no multi-peril crop insurance available on sesame.

Risk Management Assessment of the USDA has begun the process to develop a crop insurance instrument for sesame. Now is the time to be establishing your base yields.

NAP is available for sesame. Each county has different sign up dates and last planting dates.

OTHER CONSIDERATIONS

Deer, sheep, horses, and cattle do not like green sesame, but goats will eat it.

Have not seen any significant economic damage from birds.

Doves, quail, and pheasants feed off sesame on the ground.

Farmers lease out harvested sesame ground for bird hunting.

Wild hogs may bed down in sesame but generally only damage the sesame in the bedding area and the trails to food and water.

APPENDIX 1. VARIETY CHARACTERISTICS

There are 4 varieties available for 2006: S25 (US patent 6,815,576), S26 (US patent 6,781,031), S28 (applied for US patent), and S29 (applied for US patent). All 4 varieties are covered by US patent 6,100,452.

VARIETY RECOMMENDATIONS

Uvalde TX area: a. S26 for dryland b. S26 for planting prior to 1 Jun c. S28 for planting in Jun/Jul	**Gainsville, TX area:** S26 **Caprock** (farmer preference): a. S29 Primary variety b. S25 Secondary variety
San Angelo TX area: S29	**Oklahoma:** S25
Jones/Haskell TX area: S26	**Kansas:** S25

Character	Year/nursery[1]	S25	S26	S28	S29
Branching Style[2]	All	B	B	B	B
Number of Capsules per Leaf Axil	All	1	1	1	1
Maturity Class[3]	2001-2004 UV	E	M	M	E
Plant Phenotype[4]	All	B1E	B1M	B1M	B1E
Height of Plant (ft)	2004 UV	5.1	5.7	5.6	5.1
Height of First Capsule (ft)	2004 UV	1.9	2.1	2.0	1.9
Capsule Zone Length (ft)	2004 UV	3.1	3.6	3.5	3.2
Number of Capsule Nodes	2004 UV	32	31	31	29
Average Internode Length within Capsule Zone (in)	2004 UV	1.2	1.4	1.4	1.3
Yield at Drydown (kg/ha)	2004 UV	1030	1540	1591	1559
	2005 UV	1273	1566	1553	1537
	2004 LO	827	765	656	810
	2005 LO	718	710	714	903
Resistance to Drought	2000 SA	2.5	6.4	NT[5]	NT
Leaf Length (cm)	5th – 2004 UV	24.1	28.7	28.8	32.7
	10th – 2004 UV	18.8	27.1	23.7	22.8
	15th – 2004 UV	14.8	17.9	17.7	19.8
Leaf Blade Length (cm)	5th – 2004 UV	14.9	15.5	17.0	18.2
	10th – 2004 UV	14.6	17.7	17.5	16.9
	15th – 2004 UV	12.4	14.4	14.5	16.4
Leaf Blade Width (cm)	5th – 2004 UV	10.4	17.1	21.0	21.2
	10th – 2004 UV	4.3	7.0	6.5	5.8
	15th – 2004 UV	2.0	2.7	2.9	3.4
Petiole Length (cm)	5th – 2004 UV	9.2	13.2	11.8	14.5
	10th – 2004 UV	4.2	9.4	6.2	5.9
	15th – 2004 UV	2.4	3.5	3.2	3.4
Number of Carpels per Capsule	All	2	2	2	2
Capsule Length (in)	2001-2005 All	1.13	0.87	0.88	1.09

[1] Data is from four nurseries: UV = Uvalde TX, LO = Lorenzo TX, SA = San Angelo TX, and YU = Yuma AZ
[2] B = true branches
[3] E = early and M = medium
[4] Composite of branching style, number of capsules per leaf axil, and maturity class
[5] NT = not tested. Condition, disease, or insect has not been encountered.

Character	Year/nursery[1]	S25	S26	S28	S29
Seed Weight per Capsule (g)	2001-2005 All	0.212	0.234	0.228	0.230
Capsule Weight per Capsule (g)	2001-2005 All	0.143	0.168	0.170	0.163
Capsule Weight per cm of Capsule (g)	2001-2005 All	0.048	0.073	0.075	0.057
Visual Shatter Resistance	All	W[1]	W	W	W
Shaker Shatter Resistance (%)	2001-2005 All	73	73	75	76
Capsule Shattering Type	All	SR[2]	SR	SR	SR
Non-dehiscent Test	All	ND[3]	ND	ND	ND
Days to Flowering	2004 UV	42	44	44	40
	2005 UV	36	43	42	41
	2005 LO	38	41	41	37
Days to Flower Termination	2004 UV	83	90	88	82
	2005 UV	77	88	83	82
	2005 LO	77	75	74	72
Days to Physiological Maturity	2001-2005 adj[4]	91	100	98	94
	2004 UV	98	105	104	102
	2005 UV	100	106	104	101
	2005 LO	96	99	97	98
Days to Direct Harvest	2004 UV		146	146	152
	2005 UV	122	136	136	134
	2005 LO	147	137	136	143
Seed Color	All	BF[5]	BF	BF	BF
Seed Weight – 100 Seeds from 10cap test (g)	2001-2004 All	0.308	0.335	0.342	0.322
Kill Resistance	2004 UV	4.3	6.8	7.2	7.0
	2005 UV	5.2	6.2	6.4	7.0
	2005 LO	7.9	7.5	7.6	7.6
Resistance to Fusarium Wilt (*F. oxysporum*)	2004 UV	4+	6+	7	7
Resistance to Phytophtora Stem Rot (*P. parasitica*)		NT	NT	NT	NT
Resistance to Charcoal Rot (*Macrophomina phaseoli*)		NT	NT	NT	NT
Resistance to Bacterial Black Rot (*Pseudomonas sesami*)	2004 UV	8.00	7.31	7.04	7.97
Resistance to Silverleaf White Fly (*Bemisia argentifolii*)	2004 YU	NEC-	NEC[6]	NEC	NEC
Resistance to Green Peach Aphid (*Myzus persica*)	2004 UV	8.00	8.00	7.93	7.98
Resistance to Pod Borer (*Heliothis* spp.)	2001 UV	NEC	NEC	NT	NT
Resistance to Army Worms (*Spodoptera* spp.)		NT	NT	NT	NT
Resistance to Cabbage Loopers (*Pieris rapae*)		NT	NT	NT	NT

[1] W = weather shatter resistant
[2] SR = shatter resistant
[3] ND = non-dehiscent
[4] Maturity depends on moisture and fertility. Overall maturity is adjusted by comparing to S24 by subtracting the maturity of S24 from 95, and then applying the difference to all other lines.
[5] BF = buff color
[6] NEC = no economic damage - not enough disease to do ratings

APPENDIX 2. PLANTING EQUIPMENT

ROW PLANTING EQUIPMENT

Use cotton/corn planters with low rate "dryland" sorghum plates/cups, low rate sorghum, raw sugar beet discs, or drums for air planters.

A 3 lbs/ac setting for low rate sorghum plates is usually close to 3 lbs/ac for sesame.

***Plate planters*:**

Accurate 2 piece plastic plate sets for IHC and John Deere planters can be ordered from Lincoln Ag-Products Company, Lincoln, Nebraska, at (402) 464-6367, lincolnagproducts.com. These compensate for false bottom wear and provide good seed control.

John Deere 71 flex, 800, plate style Max-emerge, and other older JD plate style planters: Lincoln Ag Products part # B-Sorg 00-30 Plate, BFR-1 Ring.

International 186, 386, and older units: Lincoln Ag Products part # C-Sorg 00-30 Plate, CFR-1 Ring.

A red "Star Knocker" #CSK-1 helps these plates avoid seed damage.

Hints to control leakage and grinding seed:
- A piece of duct tape over the sprung cutoffs riding the plate will stop leakage there. Replace cutoff if worn or grooved excessively.
- A hollow 1" roll of duct tape sticky side out 3 or 4 places on your steel false bottom "springs" the plastic plate set upwards, stopping leakage over the plate. Test plate rotation - clear any binding.
- Some farmers have used weather striping instead of duct tape

If you have to grind off 2 of the drive 'dogs' of the JD plates, do not grind any deeper than necessary.

***Air planters/Vacuum planters*:**

John Deere 7300 and 1700 vacuum planter:
- JD part # 45 cell A43066 "Small milo disc" or 45 cell H136445 "Raw sugar beet disc". Both do a good job.
- "Knocker Assembly" #AH129125 is installed with each plate.
- Initial settings on drivers: 20/24 for 2.5 to 3 lbs/ac or 24/28 for 2.0 to 2.5 lbs/ac
- Need to adjust disc to the rubber seal to reduce leakage. Tighten the disc so it is snug but turns freely. There is usually a small amount of leakage even running low vacuum (4").

International 800, 900:
- IHC part # 1546936C1 "Small seed drum"
- Must carefully shrink vent holes by hammer blows.
- There have been mixed results: It is difficult to plant enough seed. Slow planting (2 MPH) works best.

***Other planters*:**

John Deere 80: "Low rate sorghum attachment", JD part # B31298 Feed Cup Spacer, B31205 32 Cell Feed Cup, B31300 Thrust Washer.

John Deere bowl style dispenser Max-emerge: JD part # A25081 Shim, A36323 Plate, and AA25319 bowl set.

DRILL PLANTING EQUIPMENT

Drills must have the ability to meter seeding rates to 25-35 seeds per foot without grinding seed. Even out dispenser mounts and check narrowest one.

Double disc openers are preferred. There should be minimal compaction over the seed line.

Hoe drills can be used with modifications since they tend to mix dry dirt with the seed. By adding a 2" extension on each side of the tube, the dry dirt can be kept out until the seed falls on to the firm, moist seed bed.

Double run drills often crush the seed.

Broadcasting the seed and working it in with a brillion planter has been tried a dozen times or more and has never worked!

APPENDIX 3. HARVEST DETAILS

CROP PROGRESSION TO HARVEST

Best yields are on sesame harvested on time. Be ready!!! From the time the flowering stops the combines will be running within 60-70 days (120-150 days after planting). With high moisture and fertility, crop will harvest later.

In low moisture or high population, the plants will begin to drop the bottom leaves while the plants are still flowering.

Depending on the moisture and fertility, the current varieties will stop flowering about 72-90 days after planting.

Self-defoliation and seed maturity begin as the flowering stops. The plants normally hold on to the top leaves until the upper capsules mature.

The plants will begin turning yellow.

Plants are physiologically mature when the seed in the capsules ¾ up on the capsule zone have turned from milky white to an off-white color. On the current varieties this will occur about 96-106 days after planting (earlier in low moisture/fertility and later in high moisture/fertility).

Depending on temperatures, it takes about an additional 10 days for the rest of the capsules to mature.

The capsules will begin to dry first and then the stems.

As the capsules dry, the tips will open and expose the seeds. This opening of the capsule is critical to drying the seed faster and to allowing the seed to be thrashed with a minimum of force in the combine; the faster the seed dries down, the less exposure to a hard freeze; the less force in a combine, the better the quality of the seed which can lead to bonuses.

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 a representative area and count the seeds. With S26, there are 142,500 seeds per lb. The following table shows the number of seeds in that square foot to lose a specified number of lbs per acre.

Seeds per square ft	Lbs/ac lost
3.3	1
16.4	5
32.7	10
163.6	50
327.1	100

Sixty years of work on closed capsules produced less yield in the bin and damaged seed so much that it could not be marketed for the confectionary trade.

No harvest aids are labeled for sesame. Preliminary work with Texas A&M has shown that harvest aids may become a useful tool. Initial experiments showed that applying the harvest aid prior to full maturity (about 10 days after physiological maturity) can lower yields by as much as 10%. More work will be done in 2006, and Reglone (diquat) will be in IR4 testing.

Sesame is ready when crop dries above where it will be cut.

Sesame will dry down in 120-150 days without a frost. It will dry down sooner with a frost or freeze.

Light frosts may not be helpful in that often one part of the field will be affected and not the rest. Taller plants also keep the frost off lower plants. A heavy frost or a freeze will kill the plants.

Within a couple of days after a freeze on a green/yellow plant, the plants will be brown, but it generally takes 5-8 days to dry down enough for combining. Breezes and low humidity accelerate drydown.

Few fields are uniform in drying down. In natural drydown, the outside of the fields may be greener. Thus the operator should look beyond the ends to determine when to enter. In natural drydown, there will be areas of the field that will be ready and others not. If you have the luxury of doing partial "spot" harvests, more seed can be harvested.

Some fields can be combined with traces of green. However, in high ambient humidity, even ‘dry’ fields may have marginal moisture. Like any crop, combines should sample the fields, and the moisture taken before harvesting a bin full. ***The moisture needs to be 6% or less. 6% sesame is the equivalent of 12% corn. Continuous moisture testing should be done.***

Sesame cannot be dried. Extensive testing in the US, Venezuela, and Australia has shown that wet seed is damaged before it can be dried resulting in poor grades and discounts.

COMBINING

Best yields are on sesame harvested on time. Be ready!!!

Although some combines are easier to set up than others, all colors of modern combines have been used successfully in sesame.

The machine settings and operators are more critical than the equipment. Sesame is 50% oil - it needs to be thrashed gently to avoid damaging the seed. Since 1978, almost all of the samples have met the quality and receiving standards, and experienced sesame operators account for less than 1% of the problems.

The most common problems have been:

- Trying to cut sesame above 6% moisture.
- Not monitoring for broken seed.
- Cutting through johnsongrass.
- Being too aggressive in closing down the concaves and increasing the cylinder speed.
- Trying to fill the combine bin above the inlet auger. The auger will churn the seed and damage and break the seed.
- Not adjusting the combine settings for sesame after harvesting sorghum, wheat, or corn.
- Not monitoring to make sure there is no seed in the return.
- Setting up in dry sesame and then cutting greener sesame. When crop conditions change, the settings probably will need to be changed.

The contract has grades that award bonuses or penalize with discounts. Cut a sample and take it to the delivery point to check for moisture and broken seed before delivering a whole truck load. Avoid johnsongrass, mintweed, kochia weed, wild sunflower, and melon patches.

HEADERS

The appropriate header is as important as the type of combine. **High ground speed helps keep the crop in the header.**

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 Allcrop Header is preferred, but some of the new headers that allow a higher lifting of the reel work well.

Air headers 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.

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

HEADER MODIFICATIONS

A 3-foot screen installed across the back of the header limits loss over the top of the header. A fine screen should be made of material that will allow viewing of the cutter bar and the feeding in the auger. Nylon works better than aluminum to avoid glare.

The reel is run in the top of the crop. The reel elevation cylinders should be installed in the top-most mounting holes or extended for tall crops. The reel is also retracted back into the header. The reel speed should be adjusted to ground speed.

INTERNAL COMBINE MODIFICATIONS

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

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

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

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.

GETTING STARTED

Combine settings should be as **slow** and **gentle as possible while still moving the crop through and air as high as possible without blowing seed out the back**.

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 get out.

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 discounts.

Initial settings for JD 95/96 series:
- Cylinder: 400
- Concave: open to corn
- Air: 750
- Top sieve (wheat): barely open
- Combination sieve: completely closed
- Bottom sieve: completely closed

Initial settings for IHC 1680:
- Cylinder: 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'

Initial settings 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

Rotaries have been used successfully in sesame. The rotaries use the same approach for initial setting as the conventional combines. They need to be set for gentle handling of the seed with minimum breakage of the stalks. It is sometimes difficult to separate the seed from the small trash so a rotary combine may need to move through the field much slower than conventional combines. Block internal air blast on AGCO Gleaner rotary machines, and disconnect cage "wiper".

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

Before releasing the combine to cut a whole field check the moisture and for broken seed.

MOISTURE

After entering the field, immediately check moisture of sample to make sure it is less than 6%. Stop immediately if it is at 6% or above. Sesame at 5% starts getting docked for moisture, and above 6.9% moisture, there are quality discounts. Sesame with its 50% oil heats up easily when at 6% and above. The following are visual cues that the moisture is high:
- The sesame 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
- There is little or no dust coming out of the feeder housing
- The combine will hum louder as it struggles through wet plants

There are currently no field moisture meters that are calibrated for sesame. However, most operators are able to calibrate their meters against the delivery point meter to determine a reading to stop cutting sesame. Many portables set to 'corn' read about twice the sesame moisture. When portable moisture meters are calibrated, they will not be directly correlated, e.g., if 12% corn is calibrated to 6% sesame, 10% corn will be higher than the expected 5.0% sesame, and more importantly, 13% corn is closer to 7% sesame than to the expected 6.5%.

The humidity at cutting can make a difference in the moisture. In two fields with the same amount of green, the sesame will be drier in low humidity conditions.

In humid cloudy days, starting time is usually no earlier than noon. The moisture stays fairly even throughout the afternoon. When the sun begins to set, watch the moisture. Sesame seed is hygroscopic – it will absorb ambient humidity.

In dry breezy days, the moisture will usually go down throughout the afternoon. In some cases, the sesame can still be cut after dark in West Texas in very low humidity conditions; however, when cutting after sunset increase the number of times the moisture is rechecked, particularly if the wind is from the southeast.

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

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 shatters 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

OTHER CONSIDERATIONS

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 blow the smoldering trash into the combine where it can light plant parts on fire.**

Row dividers can help, especially in heavy dense crops.

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.

An important accessory for harvesting sesame is duct tape or caulk. Make sure the combines and the trucks are well sealed and regularly walk behind both to avoid a stream of sesame across the field or the receiving point.

Clean combines and trucks for a food crop. ***If it rains, make sure to clean out the bottom of your combine bin and truck.*** If the water sits in the combine below the auger, the sesame will spoil, rot, and stink!! This odor will permeate the whole load. A spoiled load can be a total loss.

The sesame does need to be tarped while moving it a short distance. It should be tarped from rain and dew. However, if marginally moist sesame is tarped and left for several days, it can heat up. If in a barn the sesame should be left untarped. If possible, the trucks should be left open in the sun to allow further drying. Do not sprinkle the top of a load with water in order to move it without a tarp.

Sesame trash can be disced in very easily, but straw spreaders help distribute the trash. 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.

Under some partial green crop conditions with mixed drydown, some operators have installed a 1/4" hail screen over the top sieve to put the green capsules out the back and keep them out of the return. There is a very limited amount of seed that can be pulled from the green capsules, but, more important, by keeping them out of the return, they do not increase the moisture of the sample. You must weigh the following - is it more important to increase your yield by .01% by keeping the capsules or to increase your price by having the proper moisture? This has worked under some conditions in some combines but is not a universal solution. Some operators have cursed this paragraph after failing and others had very good results.

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. A sample will be sent to an independent laboratory for the official analysis. However, the moisture taken at the receiving station is the official moisture used in settlements.

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. Normally expect about a 10% deduction from the gross weight.

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 1-5 cents per pound bonus.

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 2003 through 2005. The good column is the percent of the weight that was better than the standard (std), with the other columns showing the average (avg), best, and worst.

	Good	Std	Avg	Best	Worst
Moisture	98.3	<7.0	5.0	2.2	10.2
Dockage	99.6	<14.0	4.4	0.6	34.1
Foreign matter	92.7	<2.5	1.5	0.2	25.0
Broken	96.3	<3.3	1.2	0.2	20.3
Damaged	92.6	<3.0	1.6	0.2	26.8
Other seed	87.3	<10	8.5	0	292
Test weight	98.4	>44.0	46.3	49.4	41.0

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 usually from nature, but planting 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 farmers 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 other grass seed, kochia, wild cucumbers, 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 you feel that you must harvest johnsongrass area, harvest separately; when delivering separate loads in same truck, make sure receiving facility samples and handles loads separately; unless told, sampling is done

on both hoppers into one sample. 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. This has happened many times in combines moving from sorghum to sesame.

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

PROCESSING OF SESAME

All of the quality checks applied to each load of sesame are based on 45 years experience on processing the seed in the Paris, TX, facility.

The price in the contract is based on seed that can be used in the baking trade – primarily on top of buns and breads. Most of this seed is processed to remove the hull, and produce a seed that is 99.99% pure. In order achieve this, the sesame needs to be free of johnsongrass and with minimal broken. No consumer wants to see a johnsongrass seed on his bun, and the seeds will not stick to the buns if there is much broken.

One of the common misconceptions is that since part of the hulling process is a wet process, the delivered moisture of sesame should not be important. 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. Sesame is stored for up to 7 months before processing. Wet sesame is difficult to clean which is an absolute necessity before going into the wet process.

FINAL WORDS

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. 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 over the last 28 years 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 a 1-5 cents per lb bonus.

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