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Sunflowers Grown for Dove Hunting

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Sunflower is a crop that has limited commercial production in Arkansas. Potential markets are limited, and farm-to-market transportation may be cost prohibitive.

Most producers in Arkansas are marketing seed locally as birdseed or growing sunflowers for dove hunting (Figure 1). Sunflowers grown for dove hunting can be a recreational and profitable undertaking when fields are leased for guided dove hunting ventures. Proper planning and the implementation of best management practices will enhance sunflower production. Key considerations for growing sunflowers for dove hunting include variety selection, planting date, fertilization, and weed control.

Figure 1. Doves attracted to a sunflower field.
(Courtesy of T9E Ranch, http://t9eranch.com/south-texas-dove-hunting/).

Suitable Soils and Site Preparation

Sunflower production is best suited on well to moderately-drained sandy and silt loam soils, but sunflowers can be grown on a variety of soil textures. Field drainage is a primary concern when selecting a suitable site as sunflowers are easily damaged by prolonged waterlogged conditions. Therefore, poorly drained soils that are prone to flooding or experience prolonged waterlogging following precipitation events should be avoided. Sunflower can be produced on heavy-textured clay loam soils with adequate drainage, and these soils can be advantageous during droughty years with lower than average summer precipitation. In fields with heavier textured soils or fields with poor drainage, implementing a bedded production system similar to furrow-irrigated row crops may facilitate adequate drainage and allow both wide and narrow row production options.

Establishment of sunflower can be successful using both conventional and no-till planting practices. With conventional tillage the seedbed should be firm with adequate moisture for rapid germination. Field preparation using conventional tillage equipment may include disking and rolling prior to planting. If seedbed firming (roller or bedder-roller) is not available or used, it is best to complete tillage operations at least 2 weeks prior to sunflower planting to allow the soil to settle and provide a good, firm seed bed for adequate seed-to-soil contact and germination. In no-till production systems a burndown herbicide may be applied 2 to 4 weeks prior to planting depending on weed pressure and growth.

Planting Date

Sunflowers can be planted from late March to early July, with the optimum

date being from mid-April to mid-May. Planting date should be based on relative maturity of the variety selected and considering that seed maturity should coincide with desired hunting window. For a 100-120 day sunflower, a mid-April planting date will mature near mid-August providing 2-3 weeks for field preparation prior to opening day. Soil temperature should be at least 50°F for planting. Sunflower germination requires a soil temperature near 55°F with a soil temperature at or above 65°F being ideal. Extended periods of soil temperatures below 50°F will delay germination and extend the period of susceptibility to seedling diseases. When growing sunflowers for dove, early planting dates help ensure that sunflowers are mature for the opening weekend of dove season. Care should be taken to follow current regulations available from the Arkansas Game and Fish Commission concerning baiting and crop manipulation. These regulations can change from year to year.

Sunflower Varieties and Other Planting Details

Sunflowers are not typically bred for production in southern states. However, most varieties carried by the local seed dealer or co-op will suffice for dove hunting. A black oilseed type variety is typically preferred for its good production and earliness characteristics.

Sunflowers should be planted 1 to 2 inches deep in moist soil. It is not advisable to plant more than 3 inches deep since many of the newer hybrids have a short hypocotyl that cannot emerge from deep planting.

Sunflowers may be rotary hoed to aid emergence should soil crust from compacting rains. Best results are with row- or drill-seeded sunflowers; however, broadcast incorporation is used by many growers, especially sportsmen. Care should be taken to cover seed with at least 1 inch of soil to provide sunflower the best opportunity for emergence and establishment. The likelihood of success increases greatly if a roller can be used following broadcast and incorporation to firm the seedbed. This will help prevent losses from bird damage and limit damage from preemergence herbicides.

The use of conventional planting and tillage equipment and row spacings of 30 to 38 inches (or whatever is used with other crops being grown) is best for establishing a successful stand. These row widths also allow for use of interrow cultivation as a weed control measure. Narrower rows, 15 to 18 inches, do not have a significant yield advantage over conventional row spacing when plant populations are the same, and wider rows are often desired for dove hunting.

A final stand of between 14,000 and 26,000 plants per acre is adequate for oil-type hybrids. This normally requires 3 to 5 pounds of seed per acre. The number of sunflower seed per pound varies considerably, depending upon the variety and seed size. The seed size is identified on the bag. The seed bag information will indicate the planter plates and setting needed to get a desired planting rate. The plant population with non-oil types (confectionary and birdseed) can be reduced to between 12,000 and 18,000 plants per acre. A larger seedhead and increased seed size are promoted by reducing plant population. Plant population per acre should remain the same regardless of row spacing. The seed spacing must be proportionately decreased with lower-germinating seed, but the number of seeds per foot of row is increased. A good rule of thumb to use for adjusting seeding rates is to allow for 90 percent germination and 90 percent seedling survival. Additionally, if possible, planting in the north-south direction will provide sunflower seedheads more space as they track the sun. This can help reduce seedhead contact and early seed shattering. Achieving the proper seeding rate with broadcast seeding is difficult and oftentimes broadcast seeding will result in stands that are too dense leading to increased drought potential, smaller seedheads, smaller seed and overall poor performance.

Fertilization

Fertilization for sunflower production should follow soil test recommendations for phosphorus (P) and potassium (K). Although there is no current crop code for sunflower production, using the current crop code for wildlife food plots with legumes (Crop Code 118) will provide adequate P, K, and potential lime needs but some adjustments will need to be made for nitrogen (N). Boron (B) is also a critical micronutrient for sunflower production and may benefit from B applications to sandy or silt loam soils with high pH and a history of B deficiency. Generally, soils with moderate to low levels of P and K will need nitrogen, phosphorus and potassium (NPK) at a rate of 60, 30 and 60 pounds per acre, respectively. These nutrients can be applied preplant incorporated, but sidedress applications of N in-season when the plants are at least 8 inches tall can enhance production and performance. For simplicity, producers can apply and incorporate 200 to 300 pounds per acre of triple 19 or triple 13 prior to planting or apply to dry ground ahead of a rain.

Weed Control

Consult the “Sunflower” section under the Wildlife Food Plot tab in Extension publication MP44, Recommended Chemicals for Weed and Brush Control, for specific herbicide rates and timings. (See Table 1.)

A combination of tillage, early planting and herbicides provides the best weed control program for sunflowers. Sunflowers are highly competitive plants, so early-season weed control (up to at least three weeks following sunflower emergence) is the most critical to allow the crop to gain that competitive advantage (Figure 2).

Table 1. Sunflower Herbicides, Rates and Application Recommendations

Crop, Situation, and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
SUNFLOWERS (Grown for Doves) Note: Sunflower recommendations are based on drilled or planted sunflowers with adequate seed coverage. Broadcast seeding may result in an increased risk of herbicide injury.				
Preplant Incorporated				
S-metolachlor @ 1.27 lb/A	Annual grasses, nutsedge, and small-seeded broadleaf weeds.	Dual Magnum 1.33 pt/A.	Prior to planting.	Avoid high rates.
pendimethalin @ 0.5 to 1.5 lb/A	Annual grasses and small-seeded broadleaf weeds.	Prowl 3.3 EC or Pendimax 3.3 EC 1.2 to 3.6 pt/A.	Up to 14 days prior to planting.	Incorporate within 7 days. Use low rate on sandy soils.
ethalfluralin @ 0.56 to 1.125 lb/A	Annual grasses and small-seeded broadleaf weeds.	Sonalan HFP 1.5 to 3 pt/A.	Prior to planting.	Incorporate with two passes in opposite directions no more than 48 hours after application. See label for improved ground-cherry control program.
trifluralin @ 0.5 to 1.0 lb/A	Annual grasses and small-seeded broadleaf weeds.	Treflan, Trilin, Trifluralin 4 EC 1.0 to 2.0 pt/A.	Up to 14 days prior to planting.	Incorporate immediately. Use 1 pt/A on sandy soils.
Preemergence				
S-metolachlor @ 1.27 lb/A	Annual grasses and small-seeded broadleaf weeds.	Dual Magnum 1.33 pt/A.	Immediately after planting.	Do not apply POST. Avoid high rates.
pendimethalin @ 0.5 to 1.5 lb/A	Annual grasses and small-seeded broadleaf weeds.	Prowl or Pendimax 3.3 1.2 to 3.6 pt/A.	Immediately after planting.	Must receive activating rainfall within 7 days. Do not apply POST.
pyroxasulfone @ 0.05 to 0.2 lb/A	Grasses and broadleaves, including pigweed.	Zidua 0.85 WG or Zidua 4.17 SC Pre-plant/PRE 1.0 to 4.0 oz/A or 1.75 to 6.50 oz/A POST 1.0 to 2.0 oz/A or 1.75 to 3.25 oz/A See label for specifics.	Zidua may be applied pre-plant surface, preemergence or early postemergence to sunflower for residual preemergence weed control.	Do not exceed 1.5 oz on sandy soils or 5.0 oz on other soils. Do not apply PPI, or at crack/cotyledon stages. Do not tank mix POST with Beyond on CL sunflowers. 60 day PHI.
sulfentrazone + carfentrazone @ 0.12 + 0.014 to 0.15 to 0.016 lb/A	Annual broadleaf weeds.	Spartan Charge 5 to 6 oz/A.	Up to 3 days after planting.	Do not use POST. Tank mixtures of Prowl or Dual with Spartan have performed well in University trials.
sulfentrazone + S-metolachlor @ 0.13 + 1.2 lb/A	Grass and broadleaf weeds.	BroadAxe 7 EC or Authority Elite 24 oz/A.	Immediately after planting.	Do not apply POST.
sulfentrazone + pyroxasulfone @ 0.1 + 0.1 to 0.21 + 0.21 lb/A	Grasses and broadleaves, including pigweed.	Authority Supreme 6 to 13 oz/A.	Up to 3 days after planting.	Do not apply POST.
Postemergence				
clethodim @ 0.125 lb/A	Annual grasses, johnsongrass and red rice.	Select Max 0.97 EC 16 oz/A. Use 1 qt/A or 1.0% v/v crop oil concentrate.	2 to 6 inch tall grass weeds.	Must add crop oil concentrate. Avoid applications during periods of drought.
Clearfield Sunflowers				
imazamox @0.039 lb/A	Annual grasses, suppression of johnsongrass and certain broadleaf weeds. Good on broadleaf signalgrass and foxtail.	Beyond 1 AS 5 oz/A. Surfactant and liquid nitrogen are required as a djuvants.	3 to 4 inch weeds and grass.	Avoid applications during dry periods. Preliminary research has shown that a soil-applied program is needed prior to making POST Beyond applications in Arkansas. Use on Clearfield hybrids only!

Figure 2. Nontreated control (left) versus recommended weed control strategies (right) such as planting into a clean seed bed, using a preemergence residual herbicide, and implementing interrow cultivation.

Plant in a clean, tilled seedbed or use a burndown application of glyphosate or paraquat to remove existing vegetation in no-till sunflowers. Prior to planting, a preplant-incorporated treatment of Treflan, Prowl or Sonalan can be used to provide residual grass control. After planting, a preemergence application of Prowl, Dual Magnum, or Zidua can be used for residual grass control. Spartan, BroadAxe, Authority Elite, or Authority Supreme can be applied preemergence (immediately after planting) for residual broadleaf weed control in sunflowers. However, PPO-inhibitor-resistant Palmer amaranth is now widespread across Arkansas, so expect reduced control (shortened residual) with the Spartan herbicide products on this weed species. Do not apply Spartan preplant incorporated or directly to sunflowers after they have emerged. Additionally, Zidua can be applied early-postemergence and is an excellent option as an overlapping residual to manage grasses and small-seeded broadleaves such as Palmer amaranth. All soil-applied herbicides mentioned above will require a rainfall after application to activate them.

There are currently no post-applied broadleaf herbicides for sunflowers with the exception of Beyond for Clearfield sunflowers (see below). For annual grass and johnsongrass control, a POST application of Select or other Group 1, ACCase-inhibiting herbicides can be used. Crop oil concentrate should be included with these herbicides and avoiding applications during periods of drought is necessary for optimum activity.

One or two early cultivations in combination with herbicides may be beneficial; however, cultivation should be delayed if preemergence herbicides are activated by rainfall and good weed control is established. Late-germinating morning glories can cause severe lodging late in the season in heavily infested fields. The use of POST-direct shielded sprayers or spot spraying with paraquat (Gramoxone) would help control these late-germinating morning glories or Palmer amaranth. However, care must be taken to prevent any contact with the sunflower plants or extreme crop injury will occur.

Clearfield Sunflowers

There are multiple Clearfield sunflower varieties available for production. The term “Clearfield” refers to a plant that has been selected and bred for tolerance to the imidazolinone family of herbicides. These include Scepter, Pursuit, Beyond, Newpath and several others. However, Beyond herbicide is currently the only imidazolinone herbicide registered for use on Clearfield sunflowers. In university trials, Beyond herbicide has performed fairly well on broadleaf signalgrass, johnsongrass and certain broadleaf weeds. It has not performed well on nutsedge, barnyardgrass, crabgrass and many other weeds commonly found in areas where sunflowers are grown for dove. In addition, excellent moisture and growing conditions are required prior to making postemergence applications of Beyond for optimum activity. These conditions are not always present in dryland sunflower production. Due to the increased seed and chemical costs associated with growing Clearfield sunflowers and the weed control spectrum, their use in growing sunflowers for dove in Arkansas may be cost prohibitive.

A tank-mix of Dual Magnum or Zidua plus Spartan (Authority Elite, BroadAxe, Authority Supreme) applied preemergence followed by a postemergence application of Beyond is a good herbicide program for Clearfield sunflowers.

Diseases

General recommendations for all diseases include planting resistant hybrids, rotating to a grass crop every other year, using four-year rotations where diseases are prevalent, using treated seed, planting after soil warms adequately, planting on well-drained soil, destroying old crop residue and maintaining good soil fertility.

There are several diseases of commercial sunflowers, but their importance varies greatly by region and the intensity (and frequency) of production. Important diseases historically include seed rots/seedling blights, Sunflower rust, downy mildew, stalk rot and head rots (especially Rhizopus head rot), while charcoal rot, southern blight, Alternaria and other leaf spots, Verticillium wilt and Phomopsis stem canker may become important in local situations. Descriptions and pictures of these diseases can be found at http://sunflowernsa.com/growers/diseases.

Growers who repeatedly plant on the same spot year after year are asking for trouble as diseases will build up over time, then – combined with the right environment – can take out an entire planting. So, rotation with a grass crop and destruction of old sunflower stalks and residue are good practices.

Seed rots and seedling diseases of sunflowers are common in the South, especially when the crop is planted early before soil temperatures are warm enough to sustain consistent germination and growth of the seedlings. Fungicide-treated seed will probably help where stand establishment tends to be erratic or difficult. Fungicide seed treatments labeled for use on sunflower seed include metalaxyl (Allegiance®) or mefenoxam (Apron XL®) for Pythium seed rot and damping off control; captan (Captan® and other products) for general seed protection; and azoxystrobin (Dynasty®) for Rhizoctonia seedling blight control.

Downy mildew can be a major problem on poorly drained soils, so planting in well-drained seedbeds when soil temperatures are warm will help avoid this problem. Metalaxyl and mefenoxam seed treatments may also help minimize downy mildew. Resistant hybrids should always be planted although new races of the fungus may negate this option in certain regions.

Table 2. Sunflower Foliar Fungicides, Rates and Application Recommendations.

Disease	Fungicide	Active Ingredient	FRAC Code	Rate/A	Days to Harvest	Comments
Alternaria leaf spot (Alternaria spp.), Rust (Puccinia helianthi), Powdery mildew (Erysiphe cichroacearum)	Quadris 2.08 SC (multiple generics)	Azoxystrobin	11	6-15.5 fl oz/A	30	Max of 27 fl oz/A/yr
	Headline 2.09 SC	Pyraclostrobin	11	6-12 fl oz/A	21	Max of 24 fl oz/A/yr
	Tebuconazole 3.6F (multiple generics)	Tebuconazole	3	6 fl oz/A	50	Max of 16 fl oz/A/yr
	Luna Experience	Fluopyarm + tebuconazole	7 + 3	9.0-12.8 fl oz/A	50	Max of 34 fl oz/A/yr

Foliar diseases can be mostly managed using resistant hybrids and crop rotation. However, in some areas, rust and leaf spots may become important and warrant a fungicide (Table 2). Few fungicides are registered for use on sunflower and do not provide protection against soilborne diseases such as southern blight (*Sclerotium rolfsii*), charcoal rot (*Macrophominia phaseolina*) or southern root-knot nematode (*Meloidogyne incognita*), which are common diseases and nematodes of row crops in Arkansas.

Insect Control

Cutworms/Armyworms

Insect damage to sunflowers in Arkansas is sporadic. Cutworm and armyworm larvae are occasionally damaging to newly germinated plantings, thus close monitoring early in the season is warranted. Early signs of infestation often appear as "window paning" on young leaves caused by small larvae not eating through the entire leaf. Notches on cotyledons are also a sign of larval infestations. As larvae develop, the damage will turn to wilted and dying seedlings. Under cool, wet conditions, stand reduction due to delayed plant development and pest feeding can occur. Cutworm larvae feed at night and stay concealed during the day underground within a few inches of damaged plants. The threshold for stand loss is the presence of cut plants, one or more larva per square foot and plant stands have been reduced by 15 percent or greater.

Sunflower Head Moth

The most common and the most damaging pest of sunflower in Arkansas is the sunflower head moth, *Homoesoma electellum*; however, they seldom cause damage to healthy early plantings. Late plantings can sustain economic damage. Adults are grayish in color, 3/8 to 5/8 inch long. At rest, the wings are kept close to the body, giving the moth a cylindrical or cigar shape. Adult females lay their eggs on the base of florets in the early bloom stage of the sunflower. A newly hatched larva is pale yellow and darkens to brown or purple with longitudinal white stripes as it develops. The larvae bore into the head and cause damage to the head and seed. Tangled mats of webbing on the face of flowers are a sign of infestation. Injury caused by larval feeding can cause development of fungal diseases such as Rhizopus head rot, resulting in severe yield loss.

Start scouting for head moth at early flowering. High populations can be detected by walking through fields and watching for moths to fly. The treatment threshold is one to two moths per five plants. If treatment is warranted, continue scouting through seed development. Early-planted fields typically suffer the most damage from sunflower moths while late-planted fields are less likely to develop damaging infestations. However, delayed planting increases losses from other pests. Preventative insecticide treatment is best applied as blooms begin to open. If moths are present, treatments should be made at 20 to 40 percent bloom. The objective is to kill females before eggs are laid and remove larvae before they move into the head. Multiple applications at 5 to 7 days may be required under heavy infestation. Consider using high volume applications 10 to 20 GPA by ground and 5 GPA by air.

Leaf Feeders

Leaf feeders, such as loopers, thistle caterpillar and saltmarsh caterpillar, are commonly not a problem. However, insecticide applications may be warranted if defoliation reaches 25 percent during bloom and larvae are present. Grasshopper populations should not exceed eight per square yard.

Consult the Extension publication MP144, Insecticide Recommendations for Arkansas, in the "Sunflower Insect Control" section for specific insecticide rates and timing of application (see Table 3).

Pollinators

Although hybrid sunflowers are largely self-fertilizing, some reports indicate yield may be enhanced by pollinators. Honeybees in particular are highly susceptible to many of the insecticides commonly labeled for use in sunflower. By restricting insecticide applications to very early in the morning or late in the afternoon, mortality can be reduced. Warn local beekeepers before applying insecticides to avoid problems.

Maturity & Residue Management

Maturity is indicated by change in color of the back of the head. Physiological maturity is reached when heads are flexible, yellow on the back and the outer bracts have turned

brown. When planted early, most hybrids will reach adequate maturity 2 to 3 weeks prior to the first weekend in September.

Following the dove hunting season, the remaining standing sunflower residue is highly effective at reducing soil erosion potential. When it is necessary to remove remaining sunflower residue, tillage is the primary option to stimulate rapid decomposition of the plant material.

Resources

For more information on sunflower production, see the following resources:

Arkansas Game and Fish Commission, http://www.agfc.state.ar.us/.

National Sunflower Association, https://sunflowernsa.com/growers/.

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Table 3. Sunflower Insecticides, Rate and Application Recommendations.

Insect	Insecticide	Formulation/Acre	Lb ai/Acre	Application/Comments
SUNFLOWER HEAD MOTH **Many insecticides (particularly Asana, Adjourn, Baythroid, Silencer, Proaxis, Declare, Mustang Maxx, Respect, Lambda-Cy and Warrior) are very hazardous to honeybees. If blooming sunflowers must be treated, notify local beekeepers so that bees can be moved or confined during application.**	*Bacillus thuringiensis* *chlorpyrifos* Lorsban Adv. 3.755 EC (See Generic Insecticides)	Check label 1.0-1.5 pt	0.47-0.7	DO NOT apply more than 6 pt of chlorpyrifos 4 E per season. DO NOT allow livestock to graze in treated areas.
	lambda-cyhalothrin + chlorantraniliprole (R) Besiege 1.25 SC	5-10 oz	0.049-0.098	
	beta-cyfluthrin (R) Bayrhroid XL 1 EC	2.8-2.8 oz	0.016-0.022	
	esfenvalerate (R) Asana XL 0.66 EC (See Generic Insecticides)	5.8-9.6 oz	0.03-0.05	DO NOT exceed 0.2 lb ai per acre of Asana or Adjourn per season.
	gamma-cyhalothrin (R) Proaxis 0.5 CS Declare 1.25 CS	2.56-3.84 oz 1.02-1.54 oz	0.001-0.015	
	lambda-cyhalothrin (R) Warrior II 2.08 CS (See Generic Insecticides)	1.28-1.92 oz	0.02-0.03	DO NOT exceed 0.12 lb ai per acre of Warrior, Silencer or Lambda-Cy per season after bloom initiation. DO NOT apply as ULV spray.
	methadathion Supracide 2 E	2.0 pt	0.5	DO NOT graze Supracide-treated areas or feed treated forage to livestock.
	zeta-cypermethrin 0.8 EC (R) Mustang Maxx, Respect	2.24-4.0 oz	0.014-0.025	
CUTWORM **Treat at 1 or more cutworms per sq ft or if plant stand losses are approaching the lower limits for optimum plant population.**	chlorpyrifos Lorsban 15 G	6.75 lb	1	At planting, place Lorsban granules in 6-to 7-inch band over the row behind planter. Incorporate in top 1-inch of soil.
	beta-cyfluthrin (R) Bayrhroid XL 1 EC	0.8-1.6 oz	0.007-0.013	
	esfenvalerate (R) Asana XL 0.66 EC (See Generic Insecticides)	5.8-9.6 oz	0.03-0.05	
	gamma-cyhalothrin (R) Proaxis 0.5 CS Declare 1.25 CS	1.92-3.2 oz 0.77-1.28 oz	0.0075-0.0125	
	lambda-cyhalothrin (R) Warrior II 2.08 CS (See Generic Insecticides)	0.96-1.6 oz	0.015-0.025	
	zeta-cypermethrin 0.8 EC (R) Mustang Maxx, Respect	2.24-4.0 oz	0.014-0.025	

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