Texas Crop Profile

SWEET POTATOES

Texas Agricultural Extension Service

THE TEXAS A&M UNIVERSITY SYSTEM

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This profile on sweet potato production in Texas gives an overview of basic commodity information; discusses insect, disease and weed pests; and covers cultural and chemical control methods.

Basic Commodity Information—1996-98 Average

State Rank: ....Texas is ranked fifth in total U.S. production.
Percent U.S. Production: ....10 percent
Acres Planted: 6,000
Acres Harvested: 5,800
Cash Value: $14,000,000

Commodity Destination

Ninety (90) percent of the crop goes to the fresh market, 10 percent goes to the canner.

Production Regions

Sweet potatoes are grown almost exclusively in the eastern part of Texas, primarily in or near Van Zandt County. The Texas Department of Criminal Justice grows sweet potatoes in an area near Huntsville and the production is limited to inmate consumption. In addition, there are a significant number of truck farmers in the eastern part of the state who grow and sell sweet potatoes predominately to friends and from roadside stands.

Cultural Practices

Texas sweet potato seed beds are usually established in early April using certified or on-farm grown seed. One acre of bedded seed will usually produce enough transplants, or "slips," for 100 acres of potatoes. Transplants are moved to the field mid-May to late June, preferably into deep sandy loam, fine sandy loam or loamy fine sand soils. In many cases, pesticide applications will be made at this time (planting). Fertilization is at a rate of 40 to 50 pounds of nitrogen, 20 to 45 pounds of phosphorus and 85 to170 pounds of potassium per acre. A majority of Texas sweet potatoes are the Beauregard variety; a few acres of "Jewell" also are grown. The time from planting to harvest is between 120 to 135 days.

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Pest Information

Insects

Foliage feeders

Frequency of occurrence: Foliage feeding insects generally are not a problem in Texas sweet potatoes but are considered occasional pests.

Damage caused: Foliage feeding insects damage sweet potatoes by destroying plant stems and leaves. They can be very damaging in seed beds.

Percent acres affected: Approximately 5 percent of sweet potato acreage, or 75 percent of beds, is affected.

Pest life cycles: Generally, immature cutworms, leaf hoppers, corn earworms, hornworms, loopers and armyworms will damage sweet potato foliage. The other insect growth stages are not harmful.

Timing of control: Foliage feeding insects are generally not treated in potato fields, but "slip" beds may occasionally need an insecticide application.

Yield losses: Very seldom do foliage feeding insects cause yield losses in field sweet potatoes.

Regional differences: Because sweet potatoes are grown in a relatively small geographical area of Texas, there are few regional differences.

Cultural control practices: Use of resistant plant varieties may be an important tool to evade foliage feeding insect damage, but there is no current research being conducted on this issue.

Biological control practices: Biological control could play a very important role in the management of foliage feeding insects in sweet potatoes. Pests such as loopers can be impacted by naturally occurring viral agents and parasites, and predators are known to prey on foliage feeding insects.

Table 2: Alternative Controls for Foliar Insects.

Alternative	Efficacy
Methyl parathion (PennCap M®)	Not as efficacious
Permethrin (Ambush®)	Not as efficacious

Postharvest control practices: Field sanitation and destruction of alternative hosts are important postharvest control measures.

Soil pests

Frequency of occurrence: Sweet potato damage from soil insects generally is expected if no soil insecticide is applied at planting. The soil insect complex includes flea beetle larvae, wireworms, the white grubs of June beetles and white fringe beetles.

Damage caused: Soil inhabiting insects that feed on sweet potato roots and tubers cause quality and yield losses.

Percent acres affected: Approximately 85 percent of sweet potato acreage is affected by soil pests.

Pest life cycles: Adult flea beetles feed on sweet potato leaves, but more serious damage is caused by immatures feeding on the potato tuber, which leaves a "scroll" looking blemish on the surface. Wireworms have a 1-year life cycle; immatures feed inside tubers and leave surface holes and sites for disease invasion. White grubs damage sweet potatoes by causing surface damage and tuber scarring. White grubs are the immature stages of

Table 1: Chemical Controls for Foliar Insects.

Pesticide	% Acres Treated	Type of Appl.	Typical Rates	Timing	# of Appl.
Carbaryl (Sevin®)	2	ground	1 lb. a.i. per acre	Apply when 40 percent of plants are damaged.	1
Use in IPM Programs:	The use of carbaryl can cause outbreaks of secondary pests such as spider mites.				
Resistance Management:	Would fit into resistant management scheme because of alternative chemistry but is a target of the Food Quality Protection Act of 1996.				
Efficacy Issues:	Can produce 90+ percent control of target pests.				
Endosulfan (Thiodan®)	25	ground	1 lb. a.i. per acre	Apply when 40 percent of foliage is damaged.	1
Use in IPM Programs:	Used in conjunction with field scouting. No treatments unless pest is at damage threshold.				
Resistance Management:	Offers chemistry alternatives to carbamates and synthetic pyrethroids.				

Table 3: Chemical Controls for Soil Insects.					
Pesticide	**% Acres Treated**	**Type of Appl.**	**Typical Rates**	**Timing**	**# of Appl.**
Chlorpyrifos (Lorsban®)	85	ground	2 lbs. a.i. per acre	Apply one application at planting or occasionally at mid season.	1
Use in IPM Programs:	Used in fields with a history of soil insect damage. Not used in areas where soil pests are not a problem.				
Resistance Management:	Typically not associated with a resistance management problem.				
Efficacy Issues:	*Lorsban* is more effective than *Diazinon*.				

beetles, most often June beetles. The white fringe beetle larvae cause damage similar to that of June beetle white grubs.

Timing of control: The most effective control measure is to apply soil insecticides at planting.

Yield losses: Losses up to 75 percent can result from soil insect damage in sweet potatoes. Quality also can be significantly impacted.

Regional differences: There may be some regional differences in the occurrence of soil pests in the counties where small truck crop sweet potato production occurs. However, in the major Texas sweet potato areas, there is little regional variation. The sweet potato weevil is not found in the major commercial sweet potato areas of Van Zandt, Smith and Wood counties. The weevil does occur in other parts of the state and the Texas Department of Agriculture actively monitors for this pest and maintains a statewide quarantine program.

Cultural control practices: Resistant plant varieties have shown promise in contributing to a reduction of soil insect damage. Crop rotation is important. Following a fallow season with sweet potatoes, problems with some soil insects that thrive on plant residues can result. To control white fringe beetles, avoid planting sweet potatoes in fields known to have white fringe beetle populations.

Biological control practices: Some biological control may occur with naturally occurring parasites and predators, but this is undocumented.

Table 4: Alternative Controls for Soil Insects.	
Alternative	**Efficacy**
Diazinon	Not as affective as Lorsban.
Endosulfan (Thiodan®) *Methyl parathion (PennCap M®)* Carbaryl (*Sevin*)	Used on about 1/3 of acreage in some years.

Postharvest control practices: Field sanitation can help reduce future soil insect pest problems.

Fungi and Bacteria

Postharvest rots

Frequency of occurrence: The frequency of occurrence of postharvest rots depends on harvest and storage conditions, including length in storage.

Damage caused: The occurrence of fungi and bacteria cause storage rot and decay.

Percent acres affected: A total of 30 percent of sweet potato acreage is infected by the fungi and bacteria that cause postharvest rots.

Pest life cycles: Postharvest rots causal organisms survive in field soil, seed roots and usually infects plants through wounds.

Timing of control: Treat at harvest (curing) and when sweet potatoes are processed for fresh market.

Yield losses: Sweet potatoes can sustain heavy damage from postharvest rots.

Regional differences: Generally there are no regional differences in postharvest rot occurrence.

Cultural control practices: Careful handling of sweet potatoes at harvest and during storage can help prevent postharvest rot problems. Good sanitation in fields and in storage houses also is very important.

Biological control practices: There are none available.

Postharvest control practices: Sanitation and a proper storage environment are important in postharvest control of storage rots.

Table 5: Chemical Control for Postharvest Rots.					
Pesticide	**% Acres Treated**	**Type of Appl.**	**Typical Rates**	**Timing**	**# of Appl.**
Dicloran (Botran®)	1	ground	1 lb. a.i. per 100 gals. water	Treat as harvested and when processed.	1

Seed root diseases

Frequency of occurrence: Seed root diseases are an annual problem for sweet potato growers.

Damage caused: Seed root diseases limit sweet potato slip production.

Percent acres affected: A total of 50 percent of sweet potato acreage is infected by pathogens that cause seed root diseases.

Pest life cycles: Soil borne pathogens include diseases such as scurf, southern blight and rhizopus soft rot. Roots can be contaminated prior to storage.

Timing of control: To control root diseases, it is important to treat seed and slips prior to planting.

Yield losses: Uncontrolled soil borne diseases can severely limit sweet potato slip production and establishment.

Regional differences: Seed root diseases are generally a problem in sweet potatoes statewide.

Cultural control practices: Seed root disease occurrence can be reduced with crop rotation, clean slips, proper seed root handling and storage.

Biological control practices: There are none available.

Postharvest control practices: Postharvest control practices include the proper storage and curing of roots.

Nematodes

Frequency of occurrence: Most of Texas sweet potato acreage has a problem with nematodes; usually the pest is the root knot nematode.

Damage caused: Root knot nematodes cause galls on roots, blemishes on mature potatoes and often a general stunting of vines.

Percent acres affected: A total of 80 percent of sweet potato acreage is affected by nematodes.

Pest life cycles: The life cycle of most nematodes is relatively short and is usually completed within 3 to 4 weeks. Root knot nematodes life stages consist of an egg, four larval stages (J1, J2, J3, and J4) and an adult stage.

Table 6: Chemical Controls for Seed Root Diseases.*					
Pesticide	**% Acres Treated**	**Type of Appl.**	**Typical Rates**	**Timing**	**# of Appl.**
Thiabendazole (Mertect®)	5	seed root treatment	4 lbs. a.i. per 100 gals. of water	Apply at planting or bedding.	1
Use in IPM Programs:	Applied in plant bed for control of rhizopus soft rot, scurf and Plendodomus foot rot.				
Efficacy Issues:	Possibly broader spectrum than some other registered materials.				
Dicloran (Botran®)	25	seed root treatment		Apply at planting.	1
Use in IPM Programs:	Applied in plant bed for control of rhizopus soft rot, scurf and Plendodomus foot rot.				
Efficacy Issues:	About equal to Mertect but not as broad spectrum.				
Dichloropropene + chloropicrin (Telone®)	10	soil treatment	10.8-17.1 gals. per acre	Treat prior to planting.	1
Use in IPM Programs:	Telone is applied to control of nematodes and Streptomyces soil pox.				
Efficacy Issues:	Rate of Telone will vary according to soil type.				

*There are no alternative control measures.

Table 7: Chemical Controls for Nematodes.					
Pesticide	**% Acres Treated**	**Type of Appl.**	**Typical Rates**	**Timing**	**# of Appl.**
Dichloropropene + chloropicrin (Telone C-17®)	10	ground	10.8 to 17 gals. formulation per acre	Apply 2 weeks prior to transplanting sweet potato slips.	1
Use in IPM Programs:	Treating sweet potatoes in rows prior to planting is less expensive than broadcasting and often more effective. Less chemical is used with the row treatments.				
Resistance Management:	Resistance management is not an issue.				
Efficacy Issues:	Telone is highly effective but expensive and hard to apply.				
Aldicarb (Temik®)	25	ground	10 to 20 lbs. of 15G formulation per acre.	Apply Temik to soil prior to transplanting sweet potatoes.	1
Use in IPM Programs:	None				
Efficacy Issues:	Not as efficacious as Telone but gives satisfactory control.				
Ethoprop (Mocap®)	5	ground	2.4 to 3.2 lbs. of 10G formulation per acre.	Apply prior to planting.	1
Use in IPM Programs:	Alternative to Temik				
Resistance Management:	Different chemistry from Telone and Temik				
Efficacy Issues:	Much less efficacious than Temik and Telone.				
Oxamyl (Vydate®)	1	ground spray	2 to 3 gals. formulation broadcast	Apply as soil is being bedded prior to planting.	1
Use in IPM Programs:	Vydate may be used where nematode populations are low.				
Resistance Management:	Vydate offers alternative chemistry to Aldicarb and Ethoprop.				
Efficacy Issues:	Not as efficacious as other compounds. Efficacy rating is a 4 on a scale of 1 to 5 where 1 is most effective.				

Table 8: Alternative Controls for Nematodes.	
Alternative	**Efficacy**
Chloropicrin	Efficacious, but could help if soil rot becomes a problem.
Ethoprop (Mocap®)	Not efficacious

Timing of control: Sweet potato nematicides are soil applied prior to planting.

Yield losses: Sweet potato yield losses from nematodes can be as high as 75 percent.

Regional differences: There are no regional differences in sweet potato nematode problems.

Cultural control practices: Good field sanitation should be practiced to lessen nematode problems. Rotate the crop with nonhost plants.

Biological control practices: There are no resistant sweet potato varieties currently being grown.

Weeds

Annual grasses

Frequency of occurrence: Annual grasses are a constant threat to productive sweet potatoes.

Damage caused: Annual grasses are a problem in sweet potatoes because of competition for resources such as space, nutrition and moisture.

Percent acres affected: A total of 100 percent of sweet potato acreage is affected by annual grasses.

Pest life cycles: Annual grasses complete their life cycle in 1 year. Summer annuals germinate in the spring, produce seeds and die in the fall. Winter annuals germinate in the fall, produce seeds and die in the spring or early summer.

Timing of control: Pretransplant and postemergence applications of herbicides prevent harmful weed population buildup.

Yield losses: Sweet potato yield can be seriously impacted by weed competition. Heavy weed infestation can also slow or hamper harvest.

Table 9: Chemical Controls for Annual Grasses.					
Pesticide	**% Acres Treated**	**Type of Appl.**	**Typical Rates**	**Timing**	**# of Appl.**
Glyphosate (Roundup®)	5	ground	0.75 lb. a.i. per acre	Apply prior to planting.	1
Use in IPM Programs:	The use of preplant Roundup® can help reduce the need for in-season weed control.				
Resistance Management:	Use carefully to avoid resistance.				
Efficacy Issues:	Roundup® is not effective against woody plants at low rates.				
Clomazone (Command®)	75	ground	0.75 to 1 lb. a.i. per acre	Command is applied over the top of newly transplanted sweet potato slips.	1
Use in IPM Programs:	Command is effective in controlling most annual grasses and small broadleaf weeds.				
Efficacy Issues:	Not effective against nutsedge.				
Sethoxydim (Poast®)	2	ground	0.2 to 0.3 lb. a.i. per acre	Postemergence	1
Efficacy Issues:	Poast does not control sedges.				

Table 10: Alternative Control for Grasses.	
Alternative	**Efficacy**
EPTC	EPTC will control nutsedge where Command will not.

Regional differences: There are no major regional differences in weed problems in Texas sweet potatoes.

Cultural control practices: Cultivation is a major part of sweet potato weed management. Cultivation practices include preseason field preparation, bed construction and postemergence tillage prior to vine elongation.

Biological control practices: Biological control of weeds is probably not an important factor in Texas sweet potato production.

Postharvest control practices: Postharvest tillage may help reduce the next season's weed problems.

Broadleaf weeds

Frequency of occurrence: Broadleaf weeds are a constant threat to productive sweet potatoes.

Damage caused: Broadleaf weeds damage sweet potatoes by competing with the crop for space, nutrients and moisture.

Percent acres affected: A total of 100 percent of sweet potato acreage is affected by broadleaf weeds.

Pest life cycles: The summer annual, winter annual and perennial plant groups all contain broadleaf plants that are at times considered weeds.

Timing of control: Broadleaf weeds are best controlled when the plants are small or prior to germination.

Yield losses: Sweet potato yields can be substantially reduced if the broadleaf weeds are not controlled.

Regional differences: There are no major regional differences in broadleaf weed problems in Texas sweet potatoes.

Cultural control practices: Tillage is a standard preplant and postemergence weed control practice in Texas.

Biological control practices: Natural biological control of weeds may be an important factor in Texas sweet potato production but this is generally undocumented.

Postharvest control practices: Postharvest control of weeds can reduce the next season's weed pressure.

Table 11: Alternative Control for Broadleaf Weeds.					
Pesticide	**% Acres Treated**	**Type of Appl.**	**Typical Rates**	**Timing**	**# of Appl.**
Clomazone (Command®)	75	ground	0.75 to 1 lb. a.i. per acre	Pretransplant incorporated	1
Efficacy Issues:	Command will not control nutsedge.				

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