

KEYS

TO PROFITABLE PRODUCTION

KEYS TO PROFITABLE CABBAGE PRODUCTION

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During 1977-78, Texas cabbage production averaged 17,500 acres with a value of \$44.8 million. The 3-year average during the 1975-77 seasons was 17,200 acres. Cabbage ranked second to onions in value of all vegetables produced in Texas. In 1978, cabbage accounted for 16 percent of the farm receipts from vegetables and was produced on 9 percent of the vegetable acreage. Texas competes annually with Florida as the number one cabbage-producing state in the nation.

Climatic Requirements

Cabbage is a cool weather crop, but the heads may be damaged by temperatures below 25° F. Much of the Texas crop is seeded in warm weather, but matures during fall, winter and early spring.

Cabbage requires adequate moisture for high yields and good quality. Most of the Texas commercial crop is irrigated requiring 20 to 30 inches of water. Time from seeding to maturity ranges from 110 to 130 days for a crop maturing during cold weather and 70 to 90 days for a crop maturing during early fall and spring.

Production Areas

Cabbage is produced largely as a fall and winter crop in South Texas. The Lower Rio Grande Valley produces 10,000 to 13,000 acres seeded from July through November and harvested October through April. The San Antonio-Winter Garden area grows 2,500 to 3,500 acres with a majority seeded in August through September and harvested October through March. A small amount of this acreage is seeded

January through February for May and June harvest. The Trans-Pecos and High Plains areas produce 1,200 to 1,500 acres seeded March through May and harvested June through October. Other locations in Texas each of which grow 200 to 400 acres annually are the Coastal Bend, Upper Coast, East, far West and North Central areas.

Texas cabbage shipments range from 50 to 800 car lot equivalents (40,000 pounds per car lot equivalent) per month as shown in figure 1. Peak shipments occur from November through March with low volume shipments during June through October.

Crop Rotation

Cabbage production adapts well to a crop rotation involving spring and summer crops such as cotton, grain sorghum, corn or melons. It is advisable not to follow cabbage with related crops such as broccoli, cauliflower and Brussels sprouts. Diseases common to these crops increase and carry over in the soil when grown in succession on the same land.

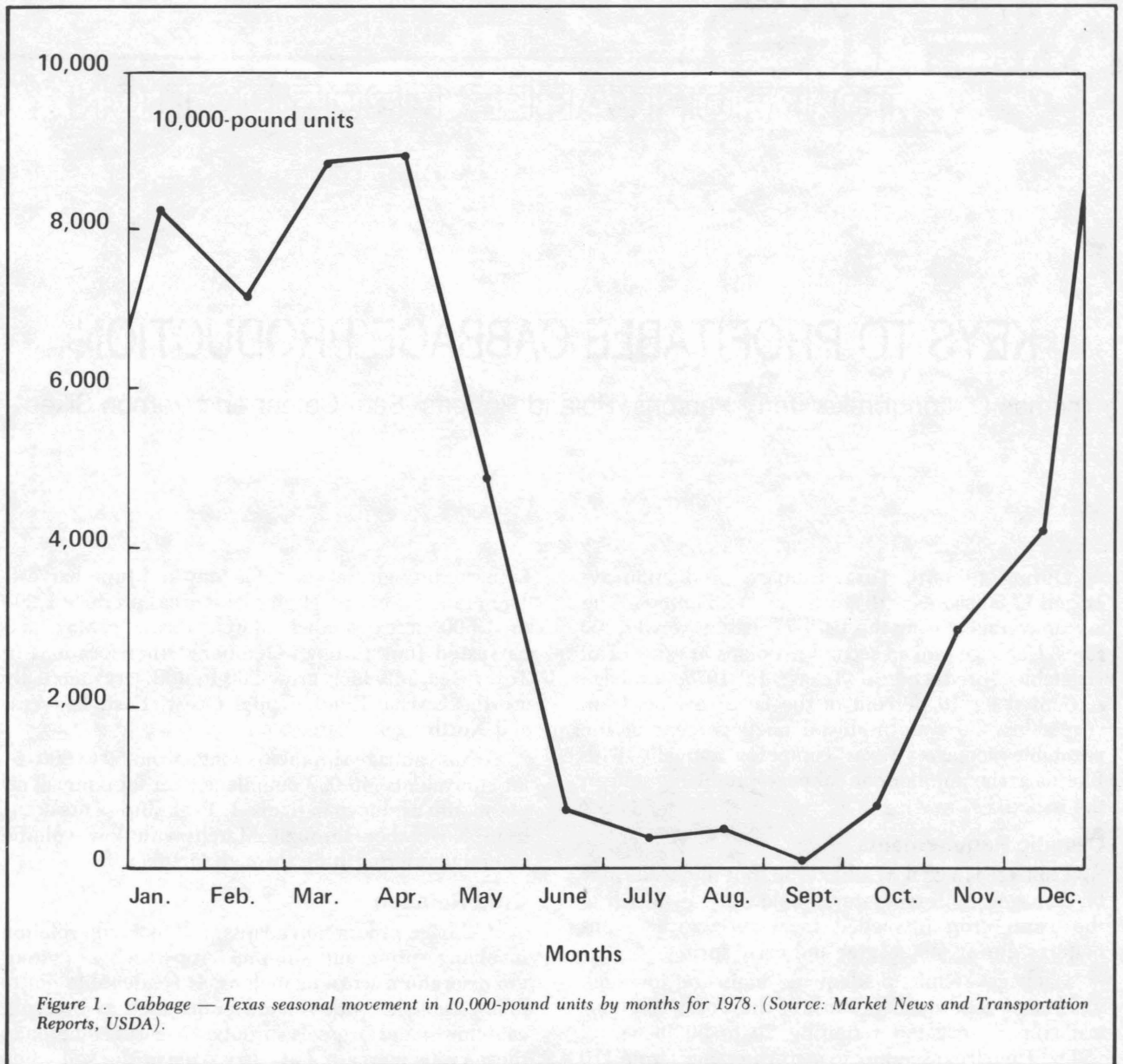
Land Preparation

A level, well-prepared seedbed is essential for successful production of direct-seeded and transplanted cabbage. Deep plowing breaks up hard-pans and turns under previous crop stubble. Disking and redisking to break up clods after deep plowing insure good drainage and promote deep root penetration. Land leveling to maintain the correct slope for uniform irrigation and adequate surface drainage is important in preparing soil for cabbage production. Land is listed in rows 36 to 40 inches apart and then flattened or shaped just before or at planting time.

Fertilization

Nitrogen and phosphorous are common nutrients deficient in major cabbage production areas in Texas.

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Potassium is normally sufficient except in deep sandy areas of East Texas. Generally, 60 to 80 pounds per acre of phosphate and 150 to 200 pounds actual nitrogen are required for high yields. Some growers prefer to broadcast 200 to 300 pounds of granular 16-20-0 per acre just before rows are formed. Others prefer to use low nitrogen-high phosphate liquid fertilizer applied in bands under the seed-row just before seeding. Make additional nitrogen applications at time of thinning and at cupping with the last application as heads are forming.

In soils where the pH is 7.8 or higher, boron deficiency may occur. Symptoms are hollow stems that turn black internally about harvest time. Five to

10 pounds of solubor applied as a foliar spray before heads begin to form reduce hollowstem.

Internal Tipburn

Tipburn is not caused by disease organisms but is a physiological disorder caused by hot, dry, windy weather that follows a period of rapid, succulent growth of the developing cabbage head. The tipburn occurs on the edges of developing leaves inside the head and is usually not detectable unless the head is cut open. Prevention is the only cure. Tipburn most likely occurs in fields that are forming heads when strong, dry winds are common. Avoid heavy, single nitrogen applications during this susceptible period

and use hybrids with known resistance to tipburn. Avoid cultivations that prune feeder roots and thus reduce water uptake in the plant. Tipburn may not show up in the head until 10 days to 3 weeks after the desiccation occurs.

Varieties

Hybrids are used almost exclusively in all production areas of Texas. Growers prefer hybrids over the open pollinated varieties for several reasons — higher yields, early and uniform maturity that reduces the number of harvests required, improved seedling vigor, better color and longer shelf life.

Varieties suggested for use according to the season best adapted are listed in table 1.

Consumer demand is greatest for cabbage heads that average 2.5 to 3 pounds and have a dark blue-green color. Three to four wrapper leaves should nearly cover the head to protect it during harvest, hauling, packing and shipping. Firm, compact heads nearly round in shape with a very slight tendency toward being taller than wide are preferred. Resistance to freezing temperatures and to bursting or splitting at maturity is very desirable.

Although some red and savoy cabbage is grown, the market is very limited.

Planting

Always use high-quality, treated seed. Nearly all cabbage in Texas is direct-seeded except when prolonged rains delay scheduled plantings. To insure continuous supplies for market later in the season, pull plants from earlier-seeded fields and transplant. Direct-seeded cabbage, planted in paired rows spaced 12 to 15 inches apart on top of flattened 40-inch rows, requires 1.5 to 2.0 pounds of seed per acre. Precision planters, such as the Stanhay belt seeder, are used to place two or three seeds at 11- to 13-inch intervals in the seed drill. Raw seed is covered approximately ¼ inch in heavy soils and ½ inch in light soils. Final stand after thinning should be 10 to 13 inches. Hybrids are faster maturing with a greater percentage of heads cut at first harvest. Fields

are often planted at 14- to 18-day intervals to extend the harvesting season.

When coated seed are planted with a precision planter, the seed requirement is about ¾ pound of raw seed per acre, but the same amount of coated seed may weigh 6 to 8 pounds. Plant coated seed ½ inch deep to allow moisture to soak through the coating. Poor germination often results if coated seed are planted in extremely hot, dry weather when soil temperatures exceed 110° F.

Weed Control

The most efficient method of controlling weeds in cabbage is to incorporate Prefar® or Treflan® 2 to 3 inches deep into preshaped rows before planting or transplanting. For crop safety use lower label rates when incorporating Treflan®. Apply Dacthal® to the soil surface after seeding or transplanting. Apply TOK® either preemergence just after seeding or postemergence after transplants are established or about 2 weeks after direct-seeded plants emerge. Always read the label and carefully follow directions.

Cultivation, when necessary, should be shallow to avoid root pruning.

Irrigation

Cabbage crops need 20 to 30 inches of water. For summer-seeded crops, two irrigations usually are required to germinate the seed and establish a stand. Frequent, light applications of water may be needed to keep the soil surface at a favorable temperature for cabbage growth and development. Apply water as often as is necessary to keep the plants in a succulent growing condition. Since cabbage has an extensive, fibrous root system, use heavy irrigations that are beneficial from head formation until harvest.

Insects and Diseases

The cabbage looper is the most serious insect pest of cabbage. Cutworms, aphids, imported cabbage worms and root aphids require control with foliar or soil applications of insecticides listed below. Read and carefully follow label recommendations.

Table 1. Varieties suggested for use according to season

Green Types				Red Types	Savoy Types
Early	Medium early	Medium	Late		
Chogo	Gourmet	Hyb 1100	Roundup	Red Head	Chieftain
Pak Rite	Market Prize	Superette	Big Cropper	Ruby Ball	Savoy
Jet Pack	Prime Pak	Rio Verde			Savoy King
Earlybird	King Cole	Grand Slam			
Wizard	Sanibel	Green Boy			
		Sentinel			
		Guardian			

Insect	Chemical
Aphid	Systox, Guthion, Diazinon, Dibrom, Parathion, Cygon or Defend. Di-Syston as banded soil treatment
Cabbage looper	<i>Bacillus thuringiensis</i> (Biotrol, Dipel or Thuricide), Lannate or Nudrin, Phosdrin, Monitor
Caterpillars (imported cabbage worm)	Sevin, Guthion, Thiodan, Dibrom, Lannate, Nudrin, Monitor or <i>Bacillus thuringiensis</i> (Biotrol, Dipel or Thuricide), Dylox, Sevin, Thiodan
Cutworm	Dylox, Sevin
Flea beetle	Sevin, Thiodan, Methoxychlor
Harlequin bug, stink bug	Thiodan, Dibrom
Root aphid	Di-Syston as banded soil treatment
Root maggot	Diazinon as preplant soil treatment

Cabbage diseases pose a serious threat to production. To prevent diseases, use a combination of practices before planting time. Probably the most important consideration is the use of disease-free seed. Black-leg, a fungus disease, and black rot, a bacterial disease, can be seed borne. Infected seed result in affected plants. Use seed grown in disease-free areas and request seed treated to reduce black rot and seedling diseases. Different varieties react differently to these diseases, and many new hybrids have shown resistance. Practice crop rotation as many disease organisms overwinter in the soil, particularly when repeated cropping with the same kind or related plants occurs. Where cabbage yellows is a problem only resistant varieties should be used, because the causal organism persists in the soil for several years. Downy mildew is almost always present, being favored by cool, damp weather. Use repeated applications of an approved fungicide such as Bravo® and Maneb®. Powdery mildew is some-

times found on cabbage, although rarely is the damage serious. Hollow heart affects cabbage when boron is lacking in the plant. In highly alkaline soils, spray 5 to 10 pounds per acre solubor over the plants before heads form. Soft rot bacteria can damage cabbage during transit. Careful handling during harvesting and packaging to avoid injuries, along with rapid cooling to 40° F. reduces losses from this and other transit diseases and prolongs the quality.

Harvesting

Most cabbage fields are harvested more than one time because of differences in plant maturity. This multiple harvest necessitates hand labor. The ultimate goal in cabbage production is the development of high-yielding, uniform-maturing varieties suitable for once-over mechanical harvest. Begin harvesting when 50 to 60 percent of the heads are large and firm enough to meet market requirements. Cabbage usually is cut by hand with a large knife as workers follow a tractor-drawn belt conveyor. The harvested head is placed on the moving conveyor and elevated to a truck or trailer. Some belt conveyors cover eight to 10 rows with nine to 11 workers following at ½ to 1 mile per hour. The cabbage is hauled to central loading stations or packing sheds for final trimming and packing. Three wrapper leaves are left to protect head from damage during packing and transporting.

Marketing

Cabbage is packed in 50-pound mesh sacks, wooden crates or fiberboard waxed cartons. Each container holds 18 to 24 heads. Filled containers are then precooled or stored temporarily in closed rooms with forced refrigerated air of 35° to 45° F. and high humidity. Cabbage is transported to destinations in refrigerated trucks or rail cars, each with capacity for 700 to 800 containers. It is sold in truckload lots to brokers, supermarket warehouses or to central markets in large cities.

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