

## KEYS TO PROFITABLE CABBAGE PRODUCTION

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During the period 1964-68 Texas cabbage averaged about 18,000 acres per year with an average annual value of over 8 million dollars. The value of Texas cabbage generally ranks fifth, following carrots, onions, potatoes and cantaloupes and honeydew melons. In 1969, cabbage accounted for 7.5 percent of the average and 8.0 percent of the value of the Texas vegetable industry.

**Climatic requirements.** Cabbage is a cool weather crop, but the heads may be damaged by temperatures in the low twenties. Cabbage requires abundant moisture. Most of the Texas commercial crop is grown under irrigation.

**Areas of production.** Cabbage is produced largely as a winter crop in South Texas. Most Texas cabbage is seeded from July through November and harvested from October through April. Cabbage is harvested in other areas of Texas in small amounts from April through September, giving Texas cabbage supplies the year around.

Texas cabbage shipments range from about 50 to 800 carlots (700 sacks per car) per month, as shown in figure 1. Peak shipments occur from December through March with low volume shipments during June through October.

**Crop rotation.** Cabbage works in well with a crop rotation involving spring or summer crops such as cotton, grain sorghum, corn or melons. Do not follow cabbage with related crops such as broccoli, cauliflower and Brussels sprouts.

**Land preparation.** A level, well-prepared seed-bed is essential for direct-seeded cabbage. Plowing, disking and re-disking to break up clods and land-planing to maintain the correct slope for irrigation and drainage are important in preparing land for

cabbage production. Land is listed into rough beds 36 to 40 inches on center and flattened or shaped just before or at planting time.

**Fertilization.** Nitrogen and phosphorus are the main nutrients deficient in the major cabbage-producing areas. Potassium is normally sufficient. Generally 60 to 80 pounds of phosphate ( $P_2O_5$ ) are required, banded 3 to 4 inches below the seed or plants. Nitrogen should be applied in three to five applications totaling 150 to 200 pounds per acre of actual N. Make the first application when a good stand has been established. Heavy applications of nitrogen alone may result in the formation of loose, puffy heads. 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 symptoms appear will prevent a deficiency.

**Varieties.** The most popular open-pollinated varieties are Greenback and Baldhead. There are numerous  $F_1$  hybrids among which Superette, Rio Verde and Roundup are popular. The market is very limited for savoy and red cabbage.

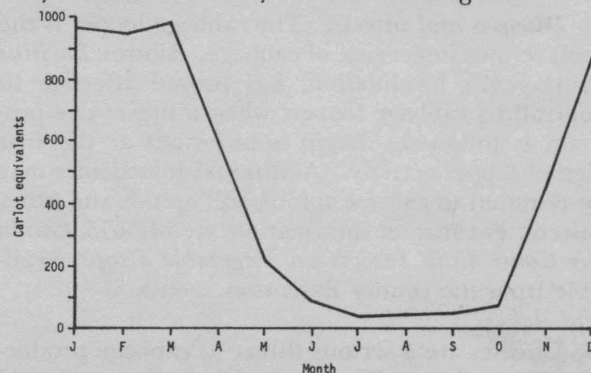


Fig. 1. Average unloads in carlot equivalents of Texas cabbage in 41 major cities by months, 1965-69.

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**Planting.** Always use high-quality treated seed. Direct-seeded cabbage, planted in paired rows spaced 20 inches apart and plants 14 inches apart in the rows, requires 2 to 3 pounds of seed per acre. When coated seed are planted with precision planters, the seed requirement is about  $\frac{3}{4}$  pound of raw seed per acre, but the seed plus coating may amount to a total of 5 to 8 pounds. Raw seed should be planted  $\frac{1}{4}$  to  $\frac{1}{2}$  inch deep, depending on soil type. Coverage is shallow on heavier soils. Plant coated seed  $\frac{1}{2}$  inch deep to allow moisture time to soak through the coating. Poor germination has resulted when coated seed were planted in extremely hot, dry weather. Final stand after thinning should be 13 to 15 inches for open pollinated varieties, and 9 to 12 inches for the hybrids. Most hybrids are faster maturing and a greater percentage of heads are cut at first harvest. Because of this, the hybrids are often planted at 15 to 18-day intervals to spread the harvest season.

**Weed control.** The most efficient method of controlling weeds in cabbage is preplant, soil-incorporated Treflan. Dacthal and Vegedex also can be used as a pre-emerge. TOK works well as a post-emergent on small weeds. For detailed information on herbicide application, see L-755, *Chemical Weed Control in Irrigated Vegetables*, available from county Extension agents. Cultivation when necessary should be shallow to avoid root pruning.

**Irrigation.** Apply irrigation water to germinate the seed and start young seedlings. Frequent light applications of water may be needed to keep the surface soil at a favorable temperature for the growth and development of cabbage. Apply water as often as necessary to keep the plants in a succulent growing condition. Since cabbage has an extensive root system, heavy irrigation may be used toward the latter part of the season.

**Diseases and insects.** The cabbage looper is the most serious insect pest of cabbage. Biotrol, *Bacillus thuringensis* formulation, has proved effective in controlling cabbage loopers when a preventive program is followed. Begin applications at the first sign of looper activity. Additional insecticides may be required to control aphids, soil aphids and other insects. For further information, see MP-675, *Guide for Controlling Insects on Vegetable Crops*, available from the county Extension agents.

Diseases are a serious threat to cabbage production in our State. The many serious diseases should be prevented, using a combination of practices that need to be considered before the crop is planted. Use high-quality, disease-free seed to reduce damage

from black rot and black leg. In addition, treatment with hot water and fungicides may be necessary to reduce black rot and seedling disease or damping-off. Practice crop rotation, since nematodes and the organisms causing cabbage yellows and black rot can survive in the soil for several years. Where cabbage yellows is a problem, use resistant varieties only. Downy mildew and powdery mildew sometimes cause damage, although not often. Powdery mildew is controlled best with sulfur, while downy mildew is controlled with maneb. Hollow heart is a condition affecting cabbage when boron is lacking in the soil. In soils that are highly alkaline, solubor at 5 to 10 pounds per acre can be sprayed over the top before heads begin to form to control this deficiency. Soft rot bacteria can damage cabbage during transit. Careful handling during harvesting and packing, along with cooling to 40 degrees F. during shipping, help reduce losses from transit disease and prolong quality.

**Harvesting.** Begin cutting when numerous heads are large and firm enough to meet market requirements. A compact head, 2 to 3 pounds, is considered optimum for fresh market cabbage. Most cabbage fields are hand harvested more than one time because of differences in plant maturity. The ultimate goal in cabbage production is the development of high-yielding, uniform-maturing varieties that are suitable for once-over mechanical harvest. Cabbage usually is cut by hand and then hauled to the packing shed in bulk trailers. Three loose wrapper leaves usually are left attached to help protect the head from bruising. Rough handling by the field crews and packing increase losses from transit and storage diseases.

**Marketing.** Cabbage from South Texas usually is marketed in 50-pound mesh bags or wire-bound crates. Some growers harvest and pack in the field, but most of the cabbage is hauled to the packing shed in bulk, where it is graded and packed.

**Cost and returns.** See Table 1 for the estimated cost and returns of Texas cabbage on a per acre basis. The cash expense, land and overhead costs are estimated at \$233.36 per acre. Cabbage marketed during the early fall usually has greater cost of production because of increased expenditures for irrigation and insect control.

See Table 2 for the cost of producing and marketing cabbage per 50-pound sack as influenced by yield per acre. The harvesting and marketing cost per acre varies with per acre yields. With higher yields, the production cost per sack decreases while the harvesting and marketing cost per sack remains the same. Selling costs generally average 10 percent of the f.o.b. price received.



Table 1. Estimated cost and returns per acre of Texas cabbage, 1969

	No. of units and value per unit		Value or cost
<b>Production receipts</b>	400 50-lb. sacks	@ \$ 1.67*	\$668.00
<b>Cash expense</b>			
Tractor and equipment	15 hr.	@ \$ .80	\$ 12.00
Tractor labor	17 hr.	@ \$ 1.50	25.50
Other labor (thinning, irrigation, etc.)	33 hr.	@ \$ 1.40	46.20
Seed	7 lb.	@ \$20.00	14.00
Fertilizer (200-80-0)	280 lb.	@ \$ .11	30.80
Insecticide	12 applications	@ \$ 2.00	24.00
Fungicide	2 applications	@ \$ 4.00	8.00
Herbicide	1 qt.	@ \$ 8.50	8.50
Irrigation water	5 applications	@ \$ 3.00	15.00
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			\$184.00
<b>Interest on operating capital, 8% for 6 months</b>			\$ 7.36
<b>Land expense</b>			
Taxes	0.5 yr.	@ \$10.00	5.00
Interest on land @ 6% on \$400	0.5 yr.	@ \$24.00	12.00
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			\$ 17.00
<b>Overhead expense</b>			\$ 25.00
<b>Total production costs</b>			<hr/>
			\$233.36
<b>Harvesting and marketing expense</b>			
Harvesting	400 sacks	@ \$ .25	100.00
Packing	400 sacks	@ \$ .65	260.00
Selling	400 sacks	@ \$ .17	68.00
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<b>Total harvesting &amp; marketing expense</b>		\$ 1.07	\$428.00
<b>Total expenses</b>			\$661.36
<b>Return to management</b>			\$ 6.64

\*Average price of Texas cabbage for 1964-68 from Bul. 49, "Texas Vegetable Statistic," Texas Crop and Livestock Reporting Service, Austin.

Figure 2 shows the relationship of the f.o.b. cost per bag of Texas cabbage to the yield per acre. The dotted lines in figure 2 show that the average yield of 400 sacks per acre of cabbage requires an f.o.b. price of \$1.65 to break even.

Table 2. Cost of producing and marketing a 50-pound sack of Texas cabbage as influenced by marketable yield per acre

No. sacks per acre	Production cost*	Harvesting, packing,* selling cost	Total f.o.b. cost
200	1.17	1.07	2.24
300	0.78	1.07	1.85
400	0.58	1.07	1.65
500	0.47	1.07	1.54
600	0.39	1.07	1.46
700	0.33	1.07	1.40
800	0.29	1.07	1.36

\*Based on cost estimates in Table 1.

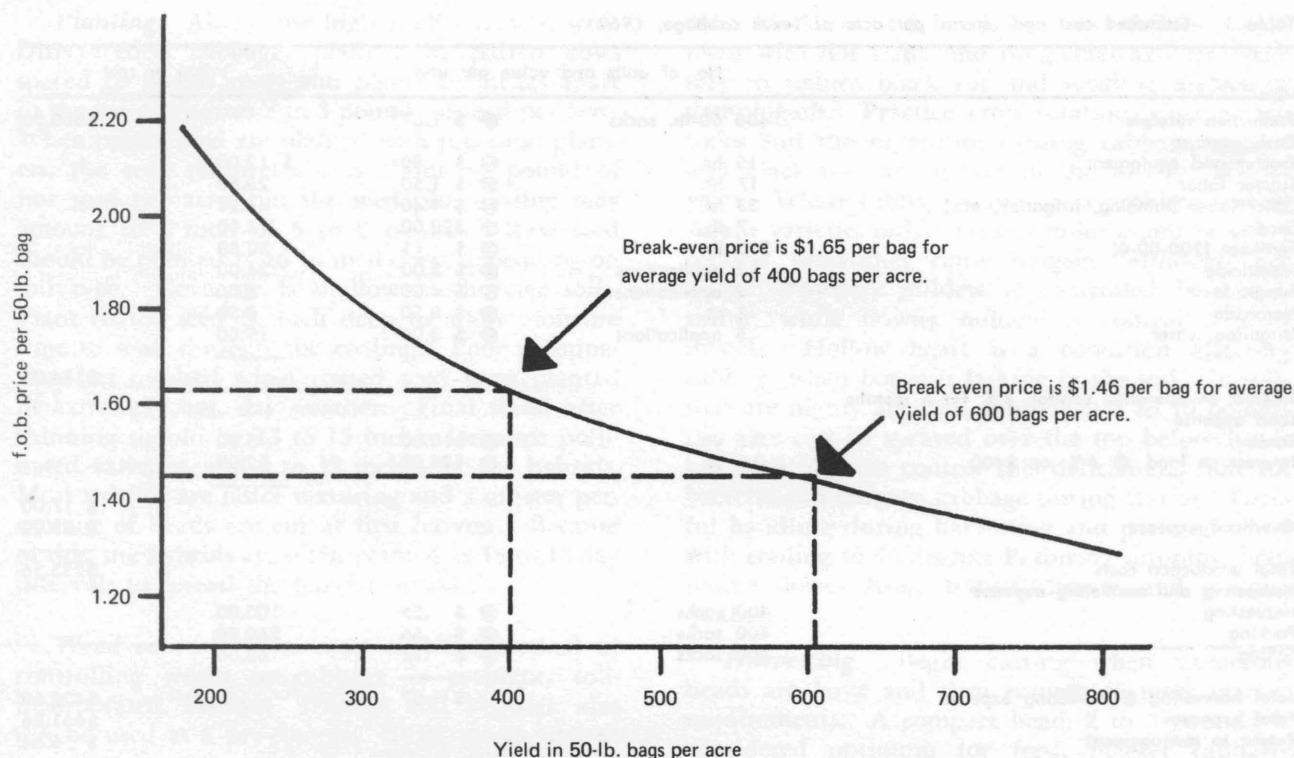


Fig. 2. Selling price per 50-lb. bag of cabbage required to break even at a given yield. (Based on cost figures in Table 1.)

**Production and marketing.** The cabbage crop of the county is small and is usually sold to local buyers. The marketing of the crop is usually done by the grower. The grower usually sells the crop to a local buyer who then sells it to a wholesaler. The wholesaler then sells it to a retailer who sells it to the consumer. The grower usually receives a price of about \$1.50 per bag. The wholesaler usually receives a price of about \$1.65 per bag. The retailer usually receives a price of about \$1.80 per bag. The consumer usually pays a price of about \$2.00 per bag.

**Cost of production.** The cost of production of cabbage is about \$1.50 per bag. This includes the cost of seed, fertilizer, and labor.

**Marketing.** The cabbage crop of the county is small and is usually sold to local buyers. The marketing of the crop is usually done by the grower. The grower usually sells the crop to a local buyer who then sells it to a wholesaler. The wholesaler then sells it to a retailer who sells it to the consumer. The grower usually receives a price of about \$1.50 per bag. The wholesaler usually receives a price of about \$1.65 per bag. The retailer usually receives a price of about \$1.80 per bag. The consumer usually pays a price of about \$2.00 per bag.

**Cost and return.** The cost of production of cabbage is about \$1.50 per bag. This includes the cost of seed, fertilizer, and labor. The return to the grower is about \$1.50 per bag. The return to the wholesaler is about \$1.65 per bag. The return to the retailer is about \$1.80 per bag. The return to the consumer is about \$2.00 per bag.

**Table 2 for the cost of marketing and selling.** The cost of marketing and selling is about \$0.10 per bag. This includes the cost of transportation and handling. The return to the grower is about \$1.50 per bag. The return to the wholesaler is about \$1.65 per bag. The return to the retailer is about \$1.80 per bag. The return to the consumer is about \$2.00 per bag.