

**A HISTORY OF THE TEXAS WINTERGARDEN SPINACH
INDUSTRY: 1918 – 2008**

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IN MEMORY OF DR. TEDDY MORELOCK

- For the past 20 years Dr. Morelock was the only public spinach breeder in the United States. Without his breeding efforts it is doubtful if spinach would have remained a profitable crop in Texas. His untimely death is a serious blow to those who knew him as well as to our industry. Unfortunately his death occurred before this manuscript was published. He will be sorely missed.



DR. TEDDY MORELOCK
JUNE 13, 1943 – APRIL 18, 2009

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....		i
FOREWARD.....		ii
Chapter		Page
I	Introduction to Industry.....	5
II	Imputes for Fresh Market Production.....	7
	Brush clearing and development of irrigation.....	7
	Railroad ad electricity generation.....	8
	Importation of labor	10
III	Industry Establishment and Transition.....	12
IV	Decline of the Industry.....	25
V	Impact of Research and Breeding.....	29
VI	Changing Face of the Industry.....	36
VII	Emergence of Processing Spinach.....	38
III	Wintergarden Spinach Producers' Board.....	41
IX	The Future: Industry: Death, Survival or Growth and Expansion.....	43
APPENDIX.....		44

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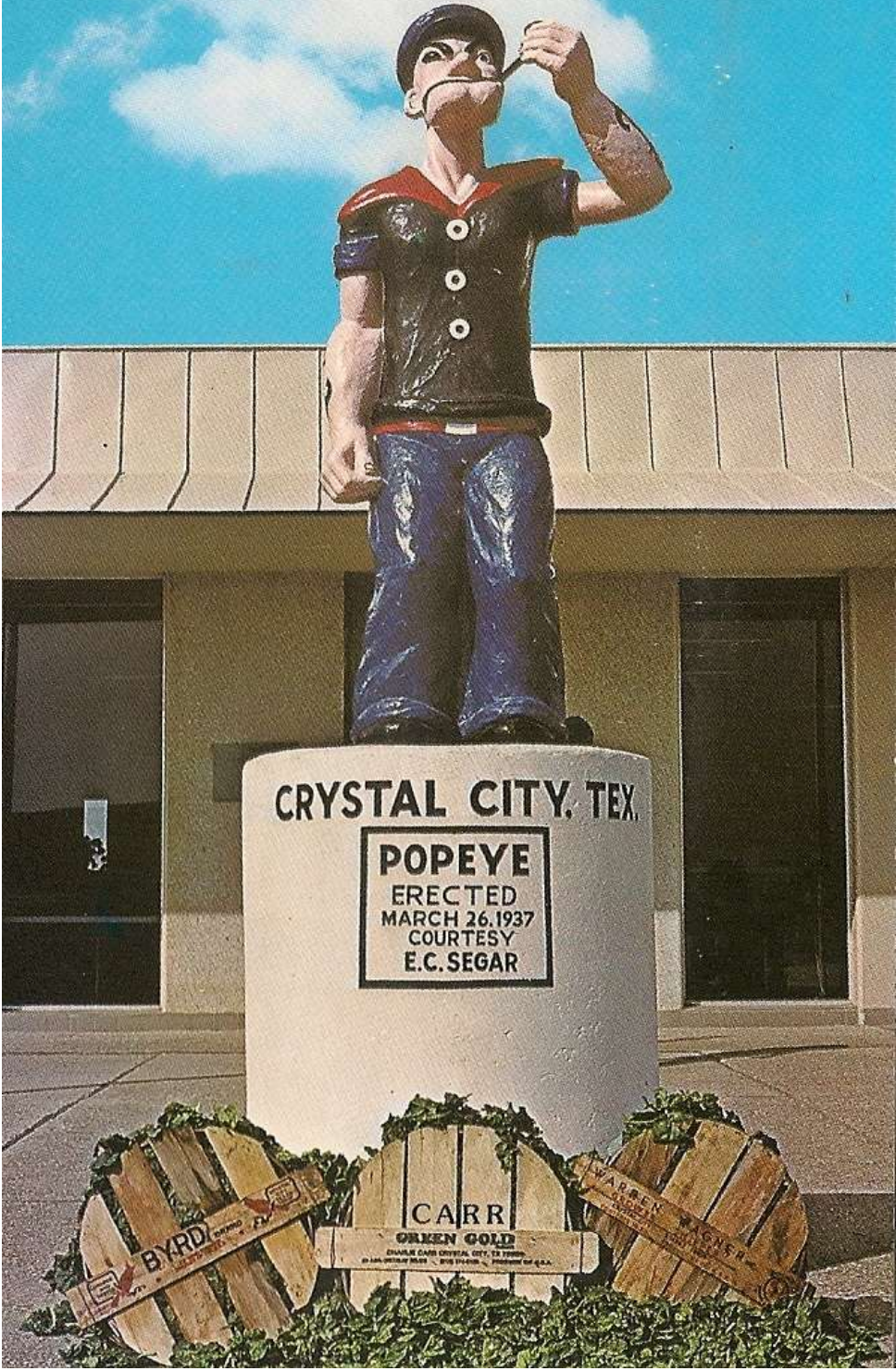
FORWARD

The establishment of spinach in the Texas Wintergarden had a major impact on the economy of the area. Unfortunately very little is documented regarding the history and development of this crop as a major commodity which ultimately helped to develop the Texas Wintergarden as a premier winter vegetable production region. Therefore the intent of this thesis is an attempt to chronicle the events that were instrumental in establishment and evolution of the spinach industry in Texas. Historically spinach production in Texas was a commodity of importance mainly in the Wintergarden region. As a result, the emphasis of this document will be centered on the Wintergarden region.

The authors dedicate this manuscript to the early industry pioneers who had the vision to see the potential of spinach as a crop in South Texas. Many of these early industry leaders were truly ahead of their times. Many of their failed attempts are considered cutting edge technology today.

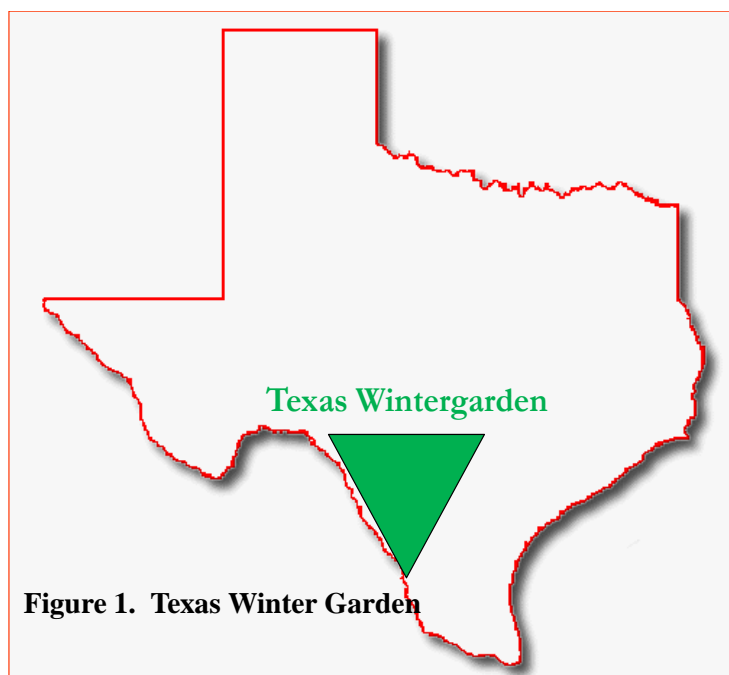
Much of the information presented within was derived from interviews with the individuals who were involved in the industry or were close to those who were. We are indebted to these individuals.

SPINACH CAPITAL OF THE WORLD



CHAPTER 1 – INTRODUCTION TO INDUSTRY

In horticultural production, spinach is considered a cool season, short day crop. It thrives best in well drained clay loam soils having a pH range from 6.5 – 8.0 in areas characterized by less than 12 hour day lengths and average daily temperature ranging from 40 – 45⁰ F lows to 65 – 70⁰ F highs (*Commercial Vegetable Production Recommendations for Texas*). Such conditions are readily found through much of the area known as the Wintergarden region in South Texas. The Wintergarden is roughly the area formed by a triangle drawn from San Antonio on the northeast down to Laredo at the south up to Del Rio at the northwest and back to San Antonio, **Figure 1**. This area is also blessed with a long growing season.



The beginning of the Wintergarden spinach industry can be traced back to a four acre test planting in the general Crystal City area in the 1917-18 growing season. The mild climate coupled with the presence of an abundance of high quality water, fertile soils, and a large labor supply, enabled successful production of high quality spinach continuously from late fall through early spring. The length of the spinach season enabled the establishment of consistent market windows which led to the great “Spinach Boom” of the 30’s, 40’s and 50’s in the Texas Wintergarden. The

great Spinach Boom resulted in Texas becoming the nation's leading spinach producing state for nearly 60 years. During a 10-year period from 1936 – 1946, spinach production in the United States averaged 70,000 A per year; 40,000 A or 80% by volume was produced in the Wintergarden, (*The online Handbook of Texas*).

Texas' reputation for producing high quality spinach was based on the use of savoy or semi-savoy varieties rather than the smooth leaf types grown in most other spinach producing regions today, **Figure 2**. To date, the farm gate value of spinach to the state's economy has exceeded 387 million dollars **thus far** with an annual contribution of 4.7 million dollars. This has represented nearly 1 billion dollars of economic

impact to the state over the life of the spinach industry. As a result, spinach historically has been one of the backbone vegetable crops produced in the region. Unfortunately weather problems,



Figure 2. Semi-savoy spinach type- Wintergreen.

declining water supplies and diseases brought an end to the “Great Spinach Boom”. Spinach has since become a minor crop in the Wintergarden.

CHAPTER II – **IMPETUS** FOR FRESH MARKET PRODUCTION

Around the turn of the 20th century, livestock was the major agricultural enterprise in the region. Crop production was limited to dry land production of a few agronomic crops. Proximity to the Chihuahuan Desert in Mexico caused rainfall to be sparse and erratic. Consequently, crops such as spinach could not be produced reliably due to the limited rainfall. It wasn't until several non environmental occurrences presented themselves which enabled the Wintergarden to become the premier spinach production region in the United States. According to personal conversations with longtime spinach industry producers (*Les Laffere, Lawrence Wilde, & Don Lindenborn*) it is speculated that the major impetuses were: the clearing of brush land and the development of irrigation potential; the construction of railroads; the construction of large capacity electricity generating plants which allowed the production of a local ice supply; and, the importation of an adequate labor supply from Mexico.

BRUSH CLEARING AND DEVELOPMENT OF IRRIGATION:

The first irrigation project in the State of Texas occurred in what became the area known as Batesville. The Bates family settled the Region in the 1870's. In 1876, Mr. Bates was given several sections of land by the State of Texas. The State also gave him permission to dam the Leona River and to dig canals to enable its flow to proceed through his land. The project was known as the Comanche Irrigation District or as the locals called it, the Comanche or Bates Ditch (*Now and Then in Zavala County – A History of Zavala County, Texas, 1986*). Thus the potential for farming operations was initiated. As today, costs to establish a farming operation was expensive. In a published report of a land dispute Mr. G. W. Willis offered the following costs for improving the land for crop production; Clearing, grubbing and fencing = \$ 50.00/A, and Well with curb = \$ 75.00/A). Sometime later, T. T. Nelson drilled the first well into the Leona gravel north of Batesville. His attempt at crop production was not successful however. In 1930, Mr. O'Keefe cleared 500 A of brush land and drilled a well into the Leona gravel south of Batesville. Thus a new era in Batesville crop production began. Two real estate men, Carl Gross and E. J. Buckingham, are credited with enabling large scale farming to become established in the Crystal City area. In 1907 they entered into a colonization venture and purchased the 11,000 A Cross-S Ranch. The ranch bordered both sides of the Nueces River. They ultimately divided the ranch into 10 A tracks they called farms. Their intent was to make it attractive for settlers to locate in the Crystal City area. In 1907, it is reported that a D. Hammond was on a crew that drilled the first water well in the area to accommodate its expanding farming interests. It was a free flowing artesian well, **Figure 3.**



Figure 3. A typical artesian well in the Winter Garden

Agronomic crops, such as cotton, were the first to be grown in the region. Early settlers grew vegetables in gardens to provide food for their families. Once irrigation water was accessible they began to experiment with commercial vegetables. Onions became the major vegetable produced and spinach soon followed. In 1908 Major Alexander Boyton established the Wintergarden ranch. In 1914 he built the Boyton Dam on the Nueces River to provide irrigation water for his nearby farms. Several other dams have since been constructed on the Nueces to accommodate agricultural water needs for the area.

A similar situation occurred in the La Pryor area. Colonel Ike T. Pryor is credited with opening this area to farming. In 1910 he formed the Zavala Land and Water Company. He also set aside 30,000 A on the west side of the Nueces River to be sold as small farms. This eventually led to the establishment of spinach as a crop by La Pryor farmers. The Rio Grande River running through Eagle Pass enabled this area to become a major crop production region about the same time (*Now and Then in Zavala County – A History of Zavala County, Texas, 1986*).

As settlement in the Southwest Texas area increased, land was cleared and farms were also established in Dimmit County (*Historical Notes of Dimmit County 1974*). Frank S. Taylor of Lymon and Taylor Consulting Engineers, New York City, was hired to develop irrigation potential for the region in 1917. The project was

constructed near Cotulla at a cost of \$ 2,600, 000. Most of the water was obtained from artesian wells (*Uvalde Leader News, August 3, 1917*). A group of investors also proposed establishment of a large capacity refrigeration facility in the area to accommodate increasing spinach production. Unfortunately, the last artesian well in the area quit flowing in 1929. This event essentially stopped spinach production in this area and the plans for the refrigeration facility.

THE RAILROAD AND ELECTRICITY GENERATION:

The rapid expansion of spinach production in the Wintergarden is attributed to two major factors in the area: the construction of the railroad throughout the area; and, the ability to generate electricity in the local communities. The railroad provided the means for growers to obtain equipment and supplies, and to ship spinach to distant markets in Chicago, New York, Canada etc. The Crystal City and Uvalde Railroad, known as the “Cat Claw & Underbrush” by the locals, linked Crystal City and La Pryor with Uvalde and the Union Pacific Railroad (*Dimmit County Mesquite Roots, Volume 1, by Laura K. Tidwell, 1984*). The San Antonio, Uvalde and Gulf Railroad linked Carrizo Springs to Crystal City and linked up with the Great Northern Railroad. This line was known as the “Sausage” by the locals and ran through Asherton, Palm, Brundage, Big Wells and other surrounding communities.

Establishment of the first large capacity electricity generating power plant in the Southwest at Crystal City occurred in 1923, **Figure 4**. Bushels were used during harvest and shipment of spinach. Officially a bushel of spinach consisted of 22 lbs of spinach and one shovel full of ice (approximately 10 lbs). The ability to ice spinach enabled shippers to maintain the quality of the large volumes of spinach shipped and played a major role in creating the “Spinach Boom” of the 20’s and

30’s.



Figure 4. Power house, Central Power and Light Company; Crystal City, TX (Photo courtesy of Joe Taylor).

On March 28, 1924, Texas Central Power Company owned by Morrison and McCall, bought the electric plant and produced the first ice on December 8, 1924

which opened up the area to the “Spinach Boom”. This power plant was capable of producing large volumes of affordable ice to meet the demands of the expanding industry. To accommodate the volume of spinach to be iced for shipment, icing docks were constructed in 1926 as well as a large ice storage vault in 1929, **Figure 5**. The docks were built at a cost of \$18,000 and could accommodate 28 rail cars at a time. The vault had a storage capacity of 9,000 tons of ice (*Now and Then in Zavala County – A History of Zavala County, Texas, 1986*).

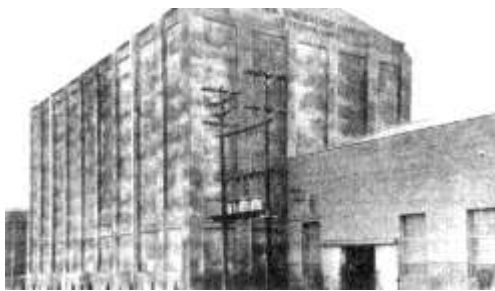
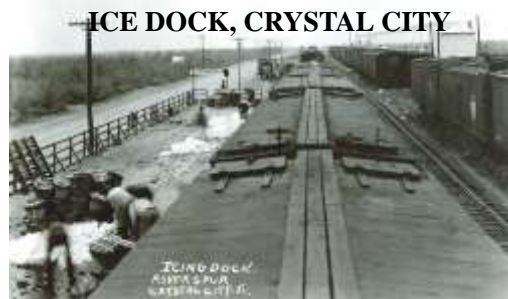


Photo appearing in “Now and Then in Zavala County – A history of Zavala county-1986.



Photos courtesy of Joe Taylor, Crystal City, TX

Figure 5. Crystal City Ice vaults and ice docks

Introduction of the Union Pacific railroad into the Crystal City / Carrizo Springs area in 1910 was a big plus for the area. It enabled early settlers to obtain farm equipment and other supplies needed for large scale intensive agriculture in addition to providing a means to export their products to distant markets. Initially vegetables were produced for home consumption with any excess produced sold or traded to neighbors in towns scattered across the region. It soon became apparent that accessibility to water enabled successful production of vegetables in the region.

IMPORTATION OF LABOR:

The development of intensive agriculture in the late teens that accompanied development of irrigation in the Wintergarden also created the need for farm workers. The farmers looked south to satisfy their labor needs. The bulk of Mexican

farm workers migrated into the region from Piedras Negras via Eagle Pass. Farmers in need of laborers let it be known among the local Mexican population who in turn told their friends and families in Mexico of the opportunities in the United States. Laborers were also brought into the region from Mexico by labor contractors. These contractors supplied workers for a fee of \$ 1.00 / person. Some workers left soon after they arrived but most remained and took up permanent residency (*SHQ Online: Vol 34 # 2*). Migrant labor camps popped up in each major production region.

A farm worker of the 1940's, Mr. Alejandro Chapa, stated that there were four labor camps in La Pryor alone. Mr. Chapa was born in La Pryor on April 7, 1931 and began working in the Bookout Farms spinach fields and sheds when he was 12 years old. According to him, farmers would go to these camps and pick up the number of laborers they needed. All of the spinach was harvested by hand with



Figure 6. Hand harvesting. (photo provided by Charlie Carr).

a butcher knife, **Figure 6.** Mr. Chapa indicated that a good spinach cutter like “his dad” could cut 100 bushels a day, “the best I could cut was 80”! In addition to cutting spinach, Mr. Chapa also worked as an ice crusher and as a basket maker. Spinach baskets were top iced in order to preserve

quality during shipment. Wooden bushels were used to ship spinach because the wood would hold moisture and prevent spinach from dehydrating during shipment (*personal communication, Fritz Coleman*). At that time only large blocks of ice were produced by the local ice plants. Axes were used to break the block ice into suitable size pieces for top icing. Baskets were assembled by hand at the packing sheds. The wooden slats, nails etc. used to make up baskets were brought into La Pryor by rail as was most all agricultural supplies. Each basket maker was given 27 thin wooden strips and sufficient nails. The strips were soaked in water prior to assembly in order to make them flexible enough to bend into the desired shape. They were dried and then nailed together by hand. It did not matter whether you were a basket maker or a spinach cutter the pay was the same, 5 cents/ bushel

(1945). At the height of the “spinach boom” there were four packing sheds in the La Pryor area. However, 90 % of the farmland was owned by C&M Produce.

Anything you needed could be had in La Pryor. There were stores, hotels, bars, a movie house and plenty of available work. At age 18, in 1949, Mr. Chapa went to work for the highway department (*Personal communications from an interview of Mr. Chapa by Marcel Valdez, CEA-Ag, Zavala County*). Similar scenarios regarding the early farms workers were numerous in areas throughout the Wintergarden.

CHAPTER III - INDUSTRY ESTABLISHMENT AND TRANSITION

According to information published by the Zavala County Historical Society (*Now and then in Zavala County - A History of Zavala County, Texas, 1986*) the Wintergarden spinach industry arguably had its beginning in the Crystal City area when the first of four acres of spinach were planted in 1917 in an experiment to determine if this crop had potential in the area. Its apparent success led to the establishment of 100 A in 1918 – 1919 which increased each year with about 5000 A planted in 1926-1927. It is not known exactly where the experiment was conducted or by whom the experiment was conducted. However, in an account of the history of the City of Asherton, appearing in the publication (*Mesquite Roots, Volume 1 by Laura K. Tidwell, 1984*) it suggests that the industry had its beginning when six carloads of spinach rolled out of Asherton in 1918. The spinach was purchased by Lee Steward, pioneer independent buyer in Asherton, and shipped to a northern market via railroad. As a result, he is credited with being the father of the Wintergarden / Texas spinach industry. Data presented in the *Texas Historical Crop Statistics: 1866 – 1989*, confirms that 1918 was the first documented shipment of Texas spinach. Consequently it is believed that 1918 was the year that large scale commercial planting of spinach began in Texas.

Around 1918 R. H. Conly began farming on a 170 acre spread. W. E. Wroe, a Chicago business man, began a farm for the food effort for World War I on 700 A of which 500 A were devoted to crops such as onions. Later he purchased another 489 A and established what was known as the Alta Verta Farms. Although his main emphasis was onions, he included spinach in his farming mix. In 1919 he and R. H. Conly merged their efforts and formed the Wroe-Conly Company (*Mesquite Roots, Volume 1 by Laura K. Tidwell, 1984*). The diversified crops produced by this venture dictated that “crop rotation on these farms was strictly adhered to thus insuring minimum loss from pests and also aiding greatly in keeping the land built up where artificial fertilization was unknown” (*The Carrizo Springs Javelin, 1924: Express Boosts County Farm Industry*). In addition to farming the Wroe-Conly Company operated packing and shipping sheds and an ice plant in Asherton. This company was one of the first spinach shipping operations in the Wintergarden. In addition to this large scale farming operation many small farms existed in the area which assisted in the establishment of spinach as a major crop. As spinach and other vegetable crops increased packing sheds popped up all across the region. Unfortunately market setbacks and rising irrigation costs seriously impacted these farms. The death blow to the Asherton area occurred when shipping rates began to exceed market value of their produce. Production in the Asherton area may have survived if the failure of “The Wintergarden Seed House” a large onion transplant operation had not occurred. The Wintergarden Seed House was the biggest

employer in the area. Most of the local production was utilized by them. Although onions plants and seed were their mainstay products, they carried a special strain of spinach seed obtained from Holland which supplied farms in the area. When this business crashed during the Great Depression so did Asherton as a major player in the spinach industry. Although other areas in the Wintergarden such as those in Dimmit County produced spinach, the major production during the “Spinach Boom” was centered in Batesville, La Pryor, Crystal City and Eagle Pass. However, Crystal City was the major production area during the boom.

The early spinach industry was truly blessed to have men with great vision and fortitude. The following is a discussion of just a few that single handedly by carved out an oasis for spinach production from what some considered a desert waste land. The establishment of the Eagle Pass area spinach industry is generally credited to John Wesley Ritchie Jr. and his brother Edward Wilson Ritchie. The Ritchie family settled in Eagle Pass around 1905 (*The Spinach Kings of Eagle Pass*), when



Figure 7. Ed W. Ritchie, Sr. enjoying a cigar in his office in the Eagle Hotel; Photo provided by Ed Ritchie.

John Wesley Ritchie was transferred from Sabines, Coahuila, Mexico coal mining operation to the Seco coal mines one mile north of Eagle Pass. The family lived on a 10 A farm north of Eagle Pass. Consequently, they grew most of the vegetables the family needed on their farm. The excess produce was taken by the

Ritchie’s by a wagon to a location near the International Bridge to Mexico and sold. After the death of John Wesley Ritchie, John Jr. and Ed formed a farming partnership in the early 1920s, **Figure 7**. This was the start of a very successful farming operation. They operated their business out of offices in the basement of the Eagle Hotel, Eagle Pass, Texas, **Figure 8**.



Figure 8. Eagle Hotel, Eagle Pass, TX as seen in late 1930's; Photo provided by Ed Ritchie III.

Hotels played key rolls in the hay day of the spinach industry. Travel and communication was slow and expensive. As a consequence spinach buyers such as the A&P Company had procurement officers on site during the season.

Consequently hotel rooms became their base of operation. Several of the larger suppliers also maintained offices in them to accommodate transactions with buyers. As a result hotels were established in each of the spinach production areas. Crystal City alone had five hotels (*personal communications, Charlie Carr*).

According to Mr. Don Lindenborn, long time spinach producer / agribusiness man in the Wintergarden, the Ritchie brothers became the largest spinach producers during the “Spinach Boom” in Texas with their production peaking at approximately 5,000 A. Don gives credit to the success of the Ritchie Brothers operation to their mother. He indicated that she was a forward thinking woman with the ability to get things done. The size and success of the Ritchie Brothers operation resulted in them being known as “The Spinach Kings”. This title was truly merited. In 1951, according to Ed Ritchie of Tiro Tres Farms, a railroad strike threatened Wintergarden spinach shipment. Ed Ritchie Sr. reacted quickly to this situation. He convinced Slick Airlines to remove seats from one of their passenger planes and load it with spinach to be shipped to Northern markets thus maintaining his market outlets, **Figure 9A**. The Templer and Bookout group decided this was a good idea. They decided to air freight spinach via Trans Texas Airways, forerunner to Continental Airlines, but found it to be too expensive to be profitable, **Figure 9B**. This innovation was ahead of its time. Today this is a common practice.



Figure 9A. Richie Bros, 1951 (Photo courtesy of Tiro Tres Farms, Eagle Pass, TX)



Figure 9B. Templer Bookout, Photo courtesy of Joe Taylor

Prior to 1950, root cut or bunched spinach was the main way to harvest spinach. Root cut spinach refers to removing the entire plant from the field by cutting off the plant just below the crown area, **Figure 10**. With bunched spinach, only leaves and stems were removed and tied into bundles. The root cut or bunched spinach was placed in wooden bushel baskets and shipped after top



Figure 10. Root cut spinach. Photo courtesy of Charlie Ritchie

icing. After 1950, essentially all of the spinach was leaf cut by hand which allowed multiple harvests and probably accounts for part of acreage reduction in the early 1950's. In an interview of spinach grower Charlie Carr by George Carmack describing spinach harvest in the *Wintergarden* (*appearing in the San Antonio Express, October 23, 1982*), Mr. Carr stated, "for the first crop, only the leaves are cut. After the first cutting the leaves grow out again and there is a second cutting – again the leaves only. The third harvest is of [root spinach]. Not only are the leaves but also the attached roots harvested."

The lack of effective control for weeds and crown maggots, and changing market preferences marked the end of root cut spinach. However, some root cutting



Figure 11. Basket made by the Little Rock Crate and Basket Company.

is practiced on a very limited scale today. As the industry expanded and the demand for baskets increased, most of the baskets were supplied by the Little Rock Crate and Basket Company, Little Rock, Arkansas, **Figure 11**, (*Personal conversations with long time spinach growers*).

As stated earlier, Colonel Ike T. Pryor is given credit for opening up the La Pryor area to farming. He sold or

leased 40 – 160 A farms to farmers which started intensive farming in the area. However, spinach became a major crop in the area when Mr. W. Childress and Mr. Meyer purchased a large acreage from Colonel Pryor. They cleared the land and formed C&M Produce. C&M's major emphasis was spinach production (*Now and Then in Zavala County, A History of Zavala County, Texas, 1986*). They produced spinach almost continuously on a year round basis and shipped their product to northern markets via the railroad, **Figure 12**



Figure 12. Farm worker loading C & M Produce spinach; Photo by Russel Lee, USDA

The shipment of large volumes of spinach required ice. Large blocks of ice were chopped into chunks and a chunk or two was placed in each bushel, **Figure 13**. The top layer of bushel baskets in each rail car was also covered with ice to help keep the spinach cool during transit. Ice was first available in La Pryor in the early 20's. Mr. R. L. Couser operated the Light and Power Works and eventually purchased the facility in 1924. He expanded his business into ice manufacturing. His plant had the capability to produce 9 tons / 48 hours. He sold the company to Central Power & Light in 1927. C&M took advantage of the abundant ground water available on their land and drilled 17 wells to pump water to their spinach fields.



Figure 13. Top icing Spinach for rail shipment

According to Mr. Don Lindenborn, his father owned a well drilling business and drilled most of the wells in the La Pryor area (*personal communication*). The pumps on these wells were powered by electric motors. C&M's operation was so intensive that they purchased a fleet of tractors to help with the farming operations. Many young men reportedly made college money by driving tractors for C&M at the rate of 15 cents per hour for 10 hour days. (*Now and Then in Zavala County – A History of Zavala County, Texas, 1986*).

During the hay day of spinach in La Pryor there were 5 – 7 sheds shipping from the city: C & M Produce, Templer- Bookout, A. E. Whitley, Huges Griffin, Ritchie Brothers, Warren Wagner and Joe Byrd (*Now and Then in Zavala County – A History of Zavala County, Texas, 1986*). The size of the Templer /Bookout operation was so large that they maintained a sizable fleet of motor powered implements. Based on the large volume of spark plugs that they purchased to keep their motors running, Champion Spark Plug company featured them in of their ads. They featured a quote by Mr. Templer in which he stated, “*We raise more profitable spinach by using machinery at every possible step. And that machinery must be dependable. Pumps sometimes run day and night without stopping, irrigating our entire spread. A breakdown could ruin a crop. The harvested crop must be rushed to northern winter markets to get top dollar. That’s why the dependability of Champion Spark Plugs is important to us—why we say Champion help raise better and more profitable spinach.*”

According to Fritz Coleman, a longtime spinach grower and chemical applicator in Batesville, there were at least five sheds shipping spinach out of Batesville as well. In addition to these shippers others bought and sold spinach from the Wintergarden during “The Boom”; D. J. Fletcher, Joseph Rosenben Co. and John C. Moritz of Philadelphia to name a few. Crystal City had many sheds with the major sheds being Wagner, Byrd, Carr, Griffin & Bran and Keller. There was also a shed at New California, later called Del Monte. It was located 7 miles north of Crystal City at the present junction of FM1025 and U.S. Highway 83 (*Now and Then in Zavala County – A History of Zavala County, Texas, 1986*).

Unfortunately, blue weed (henbit), **Figure 14**, infested the C&M fields so severely that spinach production was no longer economical. Herbicides and other agricultural chemicals were nonexistent in the region at that time. In 1942 C & M sold 5000 acres to the Farmers Home Administration who split the land into 160 acre tracts and then sold it to 35 families in attempt to encourage continued food production as a part of the World War II effort (*Now and then in Zavala County – A History of Zavala County, Texas, 1986*). It wasn’t until the 1960’s that the herbicide VegeDEX was introduced into the area to control henbit and other weeds (*personal*

communicat
ion Don
Lindenborn)

. The common method of spinach production during the glory days utilized a series of strips or areas within large production fields. These small areas were called ‘melgas.’, A



Figure 14. Henbit or Blue weed

A melga is small area or strip 20-25 feet wide that was surrounded by a small levy or berm which allowed the area to be flood irrigated, **Figure 15**. Within the melga the spinach was planted either by broadcasting or drilling which resulted in a solid planted area that was and harvested by cutting the whole plant (root cut).



Figure 15. Spinach broadcasted in a melga;
Photo courtesy of Joe Taylor)

As weeds became a more serious problem the production system evolved into spinach being planted as twin rows on top of a forty inch bed, **Figure 16.** This allowed for cultivation to control weeds, and furrow irrigation was used to supply crop water needs. This also facilitated the use of additional cultural practices such as fertilization and pesticide applications as the system evolved into leaf cut spinach and multiple

harvests. Even though weed infestation was and still can be a problem for spinach producers, Ed Ritchie III recalled an incidence related to him by his father when excessive weed infestation in a 140 A block became so bad that they decided to disk it under. A hard freeze hit the area before they were able to complete the task. As a consequence, although the weed cover was killed it protected the spinach from injury resulting in Ed. Ritchie Jr. having the only spinach in the area. What was a potential disaster turned out to be a windfall for the Ritchie's?

The abundance of water in the Wintergarden attracted growers from areas lacking in adequate supply to grow vegetables. In 1907 Dave Carr, an onion grower from the Costal Bend, migrated to Crystal City for this reason. Onion was the Wintergarden's major vegetable crop. Dave began growing spinach as a winter cash crop to support his onion operation as did other onion producers in the area. This practice also played a role in the



Figure 16 Conventionally planted spinach in 2 rows per bed.

establishment and expansion of spinach in the Wintergarden (*personal communication, Charlie Carr*).

As the spinach industry around Crystal City grew so did its coverage in the media as indicated above. Locally, the spinach crop was major news for newspapers such as the Sentinel. The progress of the crops was routinely presented in area newspapers. In the November 12, 1926 issue it was stated that “Crystal City was breaking the record of previous seasons by early harvest of 10 days”. The shipment was made by the R. B. White Company of spinach grown by Boyle and Rutledge on the Dr. Butler Farm. They also suggested that the spinach crop was projected at 25 % higher this year than that of last year for a total of 8855 A. Based on projections of average yield, it was anticipated that 2,665 cars would be needed to move the crop to market. A trainload was considered to be 50 cars. At that rate it would relate to 53 solid trainloads leaving Crystal City. At an estimated 55 cents per bushel the crop would bring 1.25 million dollars to Crystal City.

News accounts suggest that Roy Barker was one of the leading producers of fresh market spinach during the 1930’s. The November 26, 1937 issue of the Sentinel reported that Roy Barker loaded out three carloads today. The load was handled by Templer and Greer. On that same date, five carloads were bought by Roy McCormick for I. B. Hudson. However there was no confirmation that Mr. McCormick did indeed purchase the spinach for Mr. Hudson. Prices received at the track (that price paid to the growers at the time the spinach was loaded onto box cars) during the 1937-38 season were 65 cents for curly leaf spinach and 90 cents for flat leaf. Occasionally a bushel of spinach sold for \$ 1.00. On February 6, 1938 the Sentinel wrote that a total of 911 cars (train box cars) of fresh spinach were shipped to date from Crystal City. They also reported that it appeared that “the crop had reached its peak this week”.

During “The Boom” Crystal City was the largest spinach shipping point in the world and became known as “the spinach capital of the world.” The Crystal City High School adopted the color of green and gold to stand for the green gold-spinach. To acknowledge this, the first annual spinach festival was initiated in 1936 as a part of the celebration of Texas’ 100th anniversary. A spinach queen and court was elected and Governor James V. Alfred proclaimed the week of March 16 – 21st as “Spinach Week”. To formally mark the proclamation of Crystal City becoming the Spinach Capital of the World a statue of Popeye was erected (**Figure 17**). The statue of Popeye came about as a result of an idea put forth by Ernest Mortensen, a scientist from the Texas A&M Agricultural Experiment Sub Station located in Winter Haven, TX. Mr. Mortensen came up with the idea in the early thirties during a regular meeting of the Wintergarden Chamber of Commerce. “Finding nothing on the agenda after eating, he suggested that they send a note of appreciation to Mr. C. E. Segar for his promotion of our spinach with his Popeye cartoons. This passed

unanimously, so the secretary wrote a letter” to Mr. Segar. Mr. Segar replied with thanks for our letter of appreciation. This letter was printed in the Sentinel, a local newspaper, and found its way into the San Antonio Express Newspaper. One Express reader was enthused enough with the article to send a cashier’s check for \$500,000 toward a statue of Popeye. Other donations followed and soon \$ 800,000 was available for this purpose. In 1937 the statue was completed and dedicated at the Spinach Festival. The statue generated plenty of publicity by appearing in publications such as the Time magazine and National Geographic (*Now and Then in Zavala County – A History of Zavala County, Texas, 1986*).



**Figure `17.
Popeye
Statue
as seen
today
in front of
the Crystal
City City
Hall**

One of the leading grower shippers of the 1940s – 1960s headquartered in Crystal City was Warren Wagner, Inc. Warren started out as a teenager growing vegetables on his own farm. Through his efforts the farming operation became one of the largest in the Wintergarden during the mid-forties to the early seventies. Initially mixed greens and spinach were the main stay crops of the company. Most of the company’s product was shipped to northern markets in Chicago and Detroit, with A&P (Atlantic and Pacific Tea Company) a major customer (*Personal communication, Mrs. Kay Harp, Long time secretary for Warren Wagner, Inc.*). Mrs. Harp remembers Warren to be a keen businessman with a way with people.

“He took care of his people” and on a regular basis would invite his northern produce buyers down to party in Mexico. It paid off well for the company. Northern buyers such as A&P’s Kennon and McGowan were regular visitors at the Wagner Shed.

Shortly after returning from WWII Warren formed a partnership with Otis Templer and Hugh Green. In 1950 the partnership was dissolved and a new one formed between Warren Wagner and Hugh Green. Ultimately the company became known as Warren Wagner, Inc. At the peak of their operation, they produced 1000 A of spinach in the Crystal City area and shipped out of Mexico as well. Serious personal problems were the cause of the decline of the company’s success. Other significant growers and / or shippers in Crystal City at that time were Dave Carr, Raymond Herring, Joe Byrd and Roland Jarrett. Dave Carr was one of the first to try vacuum cooling spinach in a plant he had in Eagle Pass. Unfortunately this practice did not take off in the area (*Personal communications, Bart Wagner, Spinach grower, Warren Wagner Inc.*). During the Spinach Boom there were many growers/shipper/handlers operating in the Wintergarden area in and around Crystal City. Some of the more prominent companies were: D. J. Fletcher, Joseph Rosenblum, and, John C. Moritz Company of Philadelphia.

Social upheaval occurring in the Crystal City area caused by the emergence of the Raza Unida Party had a negative impact on the region. According to an account in, (*Now and Then in Zavala County – A History of Zavala County, Texas, 1986*), five Mexican-Americans were elected in 1963 to the city council for the first time in history of an Anglo-controlled city government. Although it was a short-lived administration it did give creditability to the Hispanic citizens for Jose Angel Gutierrez, the leader of the Raza Unida Party. For the next 10 years social unrest plagued the area. This unrest spilled into the agricultural community causing labor problems for many producers including spinach growers. As a consequence many Anglo farmers left the area. Others like Warren Wagner Inc. withstood the movement and continued to prosper. According to Mrs. Kay Harp, longtime secretary for Warren Wagner, Inc. the movement did not greatly impact Warren’s operation. He was a man who took care of his people and generally ignored the movement. As a result he weathered a couple of farm worker strikes (*Personal communication, Mrs. Kay Harp*). Although several other growers remained in the area and were successful, acreage declined.

It wasn’t until the early 50’s when spinach production migrated to Uvalde, Pearsall and the northern half of the Wintergarden region. Al Childers became the controlling force of spinach production in the Uvalde area. Al was the owner of C&M Produce Company of Uvalde. C&M Produce Company, Packers, Loaders and Distributors of Wintergarden vegetables was organized in 1914 as a partnership between Al and Mr. R. C. Miles. It is not known if this C&M produce is the same as

mentioned previously that operated out of La Pryor. C. W. Childers and a Mr. Meyers were together in the La Pryor company. It is strange that two produce companies with the same name, C & M, would be operating in the same general region! To further complicate the picture, both companies seem to have gone out of business in the same year. Mr. R. C. Miles died in 1924 but the company stayed incorporated until 1942 when Al Childers became sole owner, *A History of Uvalde County, Texas written by the people of Uvalde County, 1975*. During the period of time between 1924 and 1942, C & M farms annually produced 5,000 A of spinach, which was managed by Paul Ehlers. It is reported that Mr. Ehlers was one of the first to grow spinach in the Crystal City area. It is estimated that Childers shipped 3000 + carloads of spinach annually out of Uvalde during the 40's and early 50's (*personal communication, Les Laffere*). According to Charlie Carr, Al Childers had the reputation of being a gambler when it came to his farming operations. If he had more spinach than his markets could handle he would use railcars as his storage facility. Railcars loaded with spinach would normally be top iced and sealed prior to shipment. He would then ship the spinach to St. Louis in care of himself. Once sealed the spinach could be held for up to 30 days. Shipping the spinach to St. Louis gave him time to find buyers. Once a buyer was found, shipping from St. Louis cut down transit time to northern markets. This practice was also used by other shippers as well. Al Childers lived in Uvalde, grew spinach in La Pryor and maintained an office in Crystal City. He would travel between these locations on a daily basis.

Bill Jacobs, Sr. was another pioneering spinach producer that impacted the Wintergarden spinach industry. Mr. Jacobs, a native Virginian, found out from friends in New York that there was a big demand for fresh spinach in the Northern states. As a result he moved his family to Austin, Texas in 1917 to pursue the idea of producing spinach during the winter months to supply this demand. He determined that the climate around Austin was too cold for winter spinach production, and moved his family farther South to Laredo and attempted to grow spinach. Unfortunately, he found that the Laredo climate was too warm to produce quality spinach. Once again he moved his family to another location to pursue his dream. This time he selected Uvalde where he set up a small office and apartment in the Kincaid Hotel, **Figure 18**. Shortly after his arrival in Uvalde, Bill met Al Childers and arranged to buy his spinach and ship it to the northern states. His business continued successfully until his death in 1956 (*from an article by Francis Mims appearing in the Uvalde Leader News, December 21, 1980*).

Bill Jacobs, Jr., who had been working as a produce buyer for the A & P Grocery Company, assumed his father's business. According to Lawrence Wilde, the business continued to flourish under Mr. Jacobs, Jr. It was not uncommon for Jacobs to harvest between 5,000 to 6,000 bushels of spinach per day. Lawrence Wilde credits Jacobs, Jr. for developing a way to short term store excess spinach in box cars until demand for the produce occurred. Approximately 20 % of the spinach



Figure 18. Kincaid Hotel, as seen today Uvalde, TX.

was shipped from the area via semi tractor trailers with the rest being rolled out via the railroad, most of which was shipped to Joe Apilito of Canada (*Personal communication Lawrence Wilde local area farmer*).

From 1956 to 1964 most of Jacob's spinach was grown by two major growers; The

Bowman Cattle Company of Big Wells and Stoy Farms of Uvalde. Prior to this all of Jacob's spinach was supplied by Al Childers until he retired. At that point Jacobs became the sales agent for Bowman Cattle Company's spinach. When Bowman shut down their spinach production, Mr. Jacobs recruited other producers to keep his supply intact. The two major growers were Herb Toone and Johnny Miakawa. Their production accounted for half of Jacob's supply. The rest was produced by 6 – 7 other growers in the area. In the late 1970's Bill Jacobs III joined his father in the business. According to Bill Jacobs III they handled 1000 A annually with 1200A being their largest crop. Bill Jacobs III indicated that their records showed that they shipped 398,109, 382,939, and 501,004 bushels in 1980, 1981 and 1982, respectively. Bill Jacob Jr. retired in 1984 and passed away a year later (*Personal communication, Bill Jacobs, III*).

Large volumes of fresh spinach were also shipped out of San Antonio during the 50's and 60's. Bill Marvin and Sons was the dominant shipper in San Antonio. After the C&M company went out, Bill Marvin handled all of the spinach from the Batesville area and a large quantity of the Uvalde and Pearsall areas as well (*personal communications, Les Laffere, Fritz Coleman and Lawrence Wilde*). According to Mr. Coleman, Bill was ahead of his time, *Personal communications, Charlie Carr*). He was packing spinach in plastic bags and distributing it around the state until shipping costs became prohibitive. Bill Marvin was a true industry leader and a man of vision. He saw a need for an organization dedicated to marketing produce. As a result he was a founding member of the Produce Marketing Association (PMA), the major Produce commodity group in the US today. As such he was on the Associations first Board of Directors. (*Personal communications, Marilyn J. Rogish, PMA Research Specialist*). Unfortunately the untimely deaths

of Bill Marvin and his sons in a plane crash dealt a severe blow to the Wintergarden spinach industry. No one picked up his market share!

One of the influences on the growth of spinach production in the Wintergarden was its low cost of production versus returns per unit produced. Les Laffere, a long time grower in the Batesville area, indicated that in the early 50's he could produce a bushel of fresh market spinach for \$.50 at a time when a bushel of spinach was selling for \$ 2.00; thus netting \$ 1.50 per bushel produced. Lawrence Wilde, a Uvalde producer, reported a similar profitable experience during the 60's. He recalled his production cost per bushel to be \$ 1.00 while selling spinach for \$ 3.00 per bushel. Many of the production inputs practiced today such as fertilizer, herbicide, fungicide and insecticide were not available prior to their emergence in the late 40's. When they did become available they were relatively cheap compared to today's cost for these items. Don Lindenborn, a grower and ag supply dealer in the La Pryor area during the 50's and 60's, indicated that the white rust epidemic of the late 30's and early 40's was the impetus for the introduction of fungicides in spinach culture. Zineb and Maneb applied as dusts were the first fungicides used to control white rust. Fertilizer use was not introduced into the area until the late 50's. Once growers discovered the advantages of fertilization its' use spread rapidly across the area. According to Mr. Lindenborn, it was not uncommon for growers to apply 300 lbs/A nitrogen preplant and top dress with more after each cutting.

A rapid proliferation of the spinach acreage occurred in the Wintergarden in the next 20 years following the first shipment of spinach in 1918 as shown in **GRAPH 1 in the appendix...** From 1924 to 1927, a doubling of the acreage resulted (8,700 A to 19,450 A). In 1929 the area southwest of San Antonio and north of Laredo, Texas produced 12,932 acres of spinach. Zavala County alone produced 8,226 acres. A total of 10,317 car load lots of spinach were shipped in the United States during 1929 with 6007 car lots shipped from Texas while Zavala County shipped 3775 cars. These numbers show that during 1929 Texas shipped 63 per cent and Zavala County shipped 36 per cent of the spinach shipped in the United States that year. (*Texas Experiment Station Cir No 66, 1932*). Acreage nearly doubled again from 1930 to 1936 (25,260 A to 48,000 A, respectively) **Appendix GRAPH 2...** The reported price received for the initial crop was \$ 5.02/cwt, (**Appendix GRAPH 3**), which resulted in a gross return of \$271/A, an outstanding return /A for that period of time! The return/A and crop value of \$ 577,000 was the impetus which started the "Spinach Boom". Spinach acreage peaked in the Wintergarden at 48,000 A in 1936.

The average per acre yield increased steadily from the 54 cwt A of the initial crop in 1918 until 1927 when an average of 66 cwt/A was harvested (**Appendix GRAPH 4**). However, a significant drop in yield to 40 cwt/A occurred in 1928. The drop in yield is speculated to be the result of the occurrence of the

downy mildew (blue mold) disease infestation in the region. Spinach yields of 60 cwt/A occurred only once over the next 40 years. During this 40 year period yields averaged only 37 cwt/A with an all time industry low occurring in 1950, 18 cwt/A. Hard freezes and the drought of the 50's were the probable causes of the drop in yield and planted acreage. The yield/A plateau were finally broken in 1981 with the average yield/A increasing to 92 cwt. The yield over the next 12 years remained fairly stable, averaging 80 cwt/A. In 2002 another significant increase in yield was experienced by Wintergarden producers. Harvest from 2002 through 2005 produced an average 105 cwt/A. The initial spinach crop was estimated to have produced 115, 000 cwt.

As with most agricultural enterprises, when acreage increases, prices decrease (**Appendix Graph 3**). This was true from 1919 until 1946 when prices bottomed out at \$1.75/cwt. It wasn't until 1947 that price / cwt exceeded \$5.00 again. Price received finally broke the \$10.00 barrier in 1951 when \$11.75 was paid per cwt. Unfortunately, price received /cwt exceeded \$10.00 only twice prior to 1966. Price has remained above \$ 10.00 ever since 1965. It wasn't until 1976 that price rose above \$20.00 to \$21.10. The price exceeded \$ 30.00 three years later in 1979. Only twice during the history of the spinach industry has price surpassed \$40.00, 1999 at \$46.20 and, 2002 at \$ 46.00. The highest value fresh market spinach crops were produced from 1981 – 1987. The most valuable of which was harvested in 1981 when the crop exceeded 17 million dollars. Sadly, prices dropped to the 1960's level in 2005, \$ 15.40 / cwt! The wholesale price structure for fresh market spinach is a sad commentary on the value placed on the producers of our foods. In 1918 the wholesale price per pound of spinach was \$0.07. In 2006, the wholesale price per pound rose to \$0.338. This represents a 5 fold or 482% increase. However, production costs have risen 22% since 1998 (*Texas Cooperative Extension Crop Production Budgets-1998*). Net returns per acre did not keep up with rising production costs. In addition fresh market spinach growers did not reap the returns experienced by Retailers (Retail price for a cello bag of baby spinach in 2008- Uvalde, TX = \$2.78/6oz). It is without a doubt that these numbers are clear statements as to the major causes of the decline of fresh market spinach production in Texas Wintergarden.

GRAPH 4 in the index indicates that the largest total crop volumes produced occurred in the 10 year period between 1927 and 1937, the largest of which was in 1931 at 1,415,000 cwt. The high crop volumes corresponded with a time when spinach acreage was at its' highest levels. Only once in this period did the crop fail to produce over a million cwt. The Texas Wintergarden led the nation in spinach production until the early to mid eighties.

CHAPTER IV - DECLINE OF THE INDUSTRY

The downturn in acreage was incited by the Great Depression, and, increasing problems with blue mold (downy mildew), **Figure 19**. Adverse impacts of blue mold and the Great Depression were soon magnified by the emergence of an even more devastating disease, white rust, **Figure 20**. White rust diseased spinach was first found in a carload lot of spinach shipped from Texas to New York City in 1937. The next season, white rust could be found in most spinach fields in the Wintergarden. No effective control measures were available. Although the mild winter climate in the Wintergarden is advantageous for the production of high quality spinach it also favors the development of white rust and weed growth as well. White rust consistently has been a serious problem for spinach producers. The first documented report that white rust had infested spinach fields was in 1937 (*Pound and Rabbe, 1952*). The white rust disease, *Albugo occidentalis* Wilson, rapidly became the most limiting factor to



Figure 19. Downy mildew (Blue mold) disease of spinach



Figure 20. The white rust disease of spinach

spinach production in the Wintergarden. It is speculated that this disease appeared much earlier and was primarily responsible for the rapid increase in planted acreage. It is not uncommon for white rust to cause 25 – 50 % crop loss. In an era when fungicides were not yet available and variety development in the U.S. not yet been established, the only way to have sufficient harvestable product to meet market demands was to over plant.

Irrigation, the life blood of the spinach industry, was widely accepted and peaked in 1948 – 1950 as ground water levels dropped due to heavy water usage during the dust bowl era. Although there was plenty of deep water in the Carrizo Sands aquifer, pumps of that era lack the capacity to lift the water to the surface. Spinach production became a casualty when the above events combined with hard freezes, severe infestations of the white rust disease, and the lack of adequate weed control. The effects of these occurrences marked the end of the Wintergarden “Spinach Boom”!!

Although the industry has survived, the change from root cut to the multi-harvest leaf-cut production systems, the emerging bagged baby spinach industry in California, the lack of industry leadership, and the failure of local producers to rapidly adopt emerging technology has resulted in a continuing decline in spinach production in the Wintergarden. According to Fritz Coleman, there just aren’t any “tusk hogs” like there used to be in the industry. No one has jumped out and taken charge to jump start the industry! The growers today are just too content and afraid to take chances like their fathers and grandfathers did.”

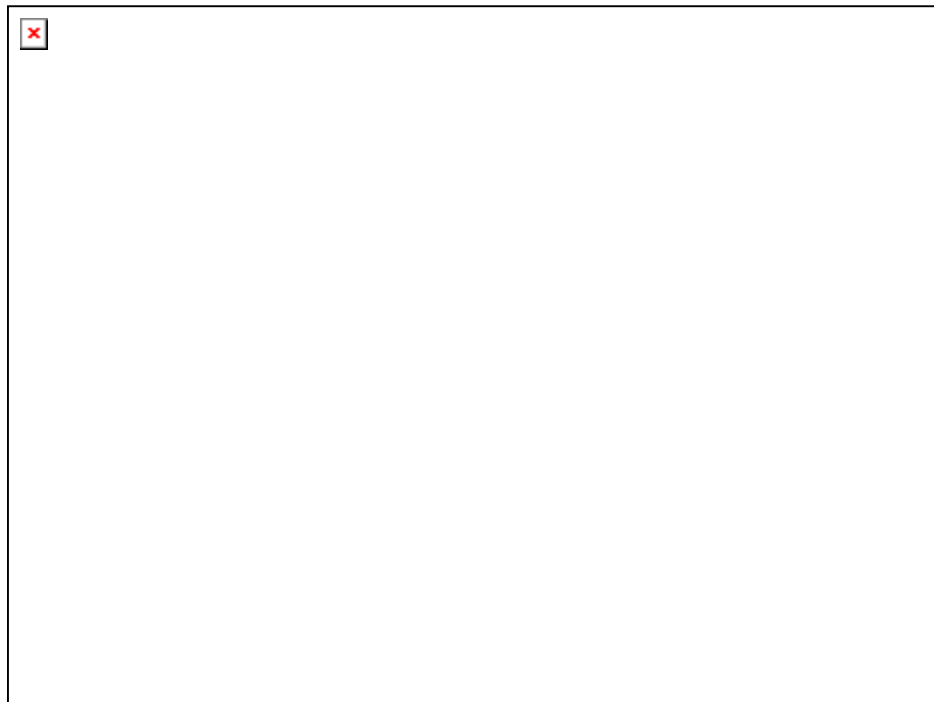
All production states normally experience acreage variations from year to year; some even have experienced acreage declines similar to Texas. Table 1 in the appendix compares the Texas acreage to that for Arizona, California and the US over a 76 year period. The year to year variation could have been caused by a whole host of factors such as diseases and insect pests, weather patterns, labor issues, water availability etc. For example, in a report by Earnest Mortensen, long time superintendent of the Texas Agriculture Experiment Sub-station at Winter Haven, he described one such drop in harvested acreage from 6500 to 4500 in 1967 was due to the adverse effect of Hurricane Beulah. *Spinach Culture. 2007. The Handbook of Texas Online.*

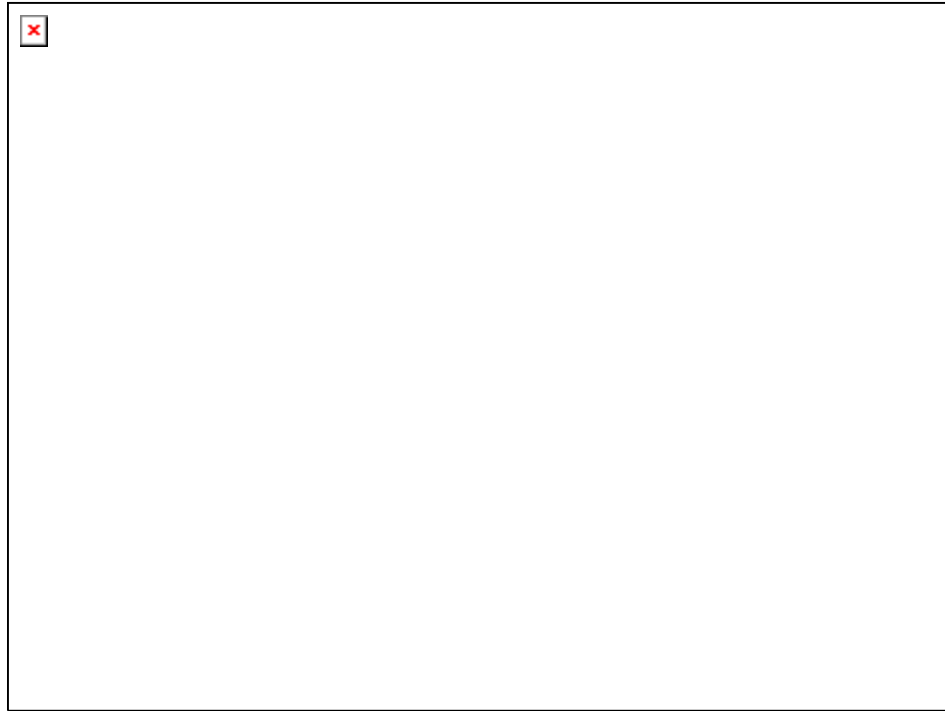
Figures 21, 22, and 23 depict how little differences have occurred in the way spinach was produced and shipped during initial 70 years of the Industry's existence.

Figure 21. Fresh market spinach harvest



Photo courtesy of Joe Taylor, Crystal City, TX





The most significant change in the production and distribution system was the conversion from the use of wooden bushel baskets to plastic blue totes for harvesting and shipping fresh spinach, **FIGURE 24**. The other major change was the use of semi- tractor trucks with refrigerated vans to transport the crop to market rather than railcars. As a result of its reluctance to change, as depicted by these photos, it is not difficult to understand why the Wintergarden has lost its competitive edge.

Figure 24. Harvest and shipping containers

THEN- 1940's



Photo source - unknown

NOW-1990's



CHAPTER V – IMPACT OF RESEARCH AND BREEDING

During the peak years of spinach production in the Texas Wintergarden, the vast majority of the seed used was imported from Europe with Holland supplying the bulk of the seed. For example in 1930 the U.S. imported 2,763,000 lbs. of spinach seed with Holland supplying 2,586,000 lbs. or 93% of the total imports (*Mich. Spec. Bul. #225, 1932*) This situation continued into the late 1950's when the United States started producing F₁ hybrid spinach seed in the Skagit Valley of Washington State. Even though the United States became a major spinach seed producer there were still significant amounts of seed imported. The United States still produces spinach seed but the major production area for the world shifted to Denmark after 2000.

When the Wintergarden spinach production started its dramatic acreage increase in the 1920's the semi-savoy variety 'Bloomsdale' became the most important variety and retained that position until late 1950's. The variety 'Bloomsdale Longstanding' was the second most important variety because it allowed production later in the spring due to its resistance to bolting (flowering). (*Texas Experiment Cir. No. 66, 1932*) 'Bloomsdale' is a very old variety which probably originated in Holland that was named and introduced to the United States in 1828 by David Landreth of Bristol, PA. The term Bloomsdale was added about 1874 after the variety was greatly improved from crossing with 'Stokes Bloomsdale Savoy'. Zwaan De Wiljes of Schumbda, Holland, introduced a reselected type in 1920 which became the leading spinach variety in the United States. (*Mich. Spec. Bul. No. 225, 1932*).

'Dark Green Bloomsdale' was introduced in 1926 by Zwaan and Van Der Molen, Voorburg, Netherlands. It was the result of self pollinating a monocious single plant selection made in the 'Bloomsdale' variety. "Dark Green Bloomsdale" became the most important spinach variety for winter culture in the southern United States. It was longer standing, darker-green and had a heavier leaf savoy, thus it was a significant improvement over the original 'Bloomsdale Savoy' but it was sometimes sold under the original name (*USDA Misc. Pub. 316, 1938*).

"Long Standing Bloomsdale" was used to extend the season for savoy type spinach. It was introduced in 1925 by Zwaan and Van Der Molen, Voorburg, Netherlands. It was developed by self pollinating a monoecious plant found in the 'Bloomsdale' variety.

One of the earliest attempts to improve crop production in the Wintergarden was the establishment of an experiment station south of LaPryor on land later owned by Mr. J. W. Adams. The experiment station was managed by J.W. Adams Sr. It is not known if the station was a cooperative effort with the state of Texas or one of its Universities or a private effort. Nor is it known exactly when and where it was established. In fact very little is known about the efforts conducted on this station. In 1930 Texas A&M University constructed a new experiment station between Crystal City and Carrizo Springs, **Figure 25**. The Winter Haven Experiment Station was located one mile north of Winter Haven in Dimmit County. The station was nine miles north of Carrizo Springs and five and one-half miles southwest of Crystal City. The Station was authorized in 1929 by the Forty First Legislature and construction began April 5, 1930. "The purpose of the 192 acre Winter Haven Station was to develop information through experimentation on fruits, vegetables and other crops and crop methods and practices which will be of value in the development of the horticultural and agricultural possibilities of the Wintergarden Region". The station was staffed by E. Mortensen, B.S., Superintendent and L.R. Hawthorn, M.S., Horticulturist, (*Texas Agricultural Experiment Station, Forty-Third Annual Report 1930*). The activities of the Winter Haven Station were moved to the new Research and Extension Center which was constructed in 1972,



Figure 25. Entrance TAES Sub-station, Winter haven, TX; Photo from a cover of an early TAES bulletin

(Impact: science at work for Texas annual report 1971-72. Texas Agricultural Experiment Station).

The use of well adapted varieties to an area is the cornerstone to a successful cropping industry. Ed Ritchie, III remembers one his father's attempts to obtain a superior spinach line. According to Ed, his father would hire high school and college boys at the end of the season to cut seed heads that had formed on desirable spinach plant types. Seed from these seed heads were removed, sacked up and sent to a seed company in Holland to be increased. Unfortunately, his father never received any seed back from this company. He speculates that they probably used it in their own breeding program, (*Personal communication, Ed Ritchie, III*).

Spinach breeding in the United States was rather limited prior to 1940. The Virginia Truck Experiment Station, Norfolk, Virginia released the mosaic resistant varieties 'Virginia Savoy' in 1921 and 'Old Dominion' in 1929. (*Mich. Spec. Bul. #225, 1932*) Paul Smith at the University of California, Davis, California was screening foreign spinach introductions for resistance to downy mildew (*Development of F₁ Spinach Hybrids, Webb, R. E., 1976 HortScience Vol 11(6):546*).

In 1939, Mr. Ernest Mortensen, Superintendent at the Winter Haven Experiment Station had contacted spinach breeders in Holland to learn how to breed spinach. The information he received and the collaboration of the above resulted in the beginning of spinach breeding in Texas. Several varieties were released from this program had a positive impact on the spinach industry.

In 1947 the USDA ARS, Beltsville, Maryland began a spinach breeding program led by Henry A. Jones. This program hoped to introduce improved varieties and F₁ hybrids adapted to the Arkansas, Oklahoma and Texas production region. Henry Jones organized a research team that included Bruce Perry, Horticulturist, Texas Agricultural, Station, Crystal City, Texas; D.M. McLeon, Plant Pathologist, ARS, Mt. Vernon, Washington; H.H. Vose, Horticulturist, Arkansas Agricultural Experiment Station, Van Buren, Arkansas; E.D. Delwich, Del Monte Corp., San Leandro, California and Crystal City, Texas. Several seed company personal most, notably Robert McDonald, Alf Christianson Seed Company, Mt. Vernon, Washington, cooperated with the research efforts.

In 1955 Jones, McLeon and Perry released "Early Hybrid 7". This semi savoy was the first downy mildew resistant F₁ hybrid spinach. (*Development of F₁ Spinach Hybrids Webb, R. E. 1976 HortScience Vol 11(6):546*). Jones retired in 1957 and released several downy mildew resistant breeding lines to the seed industry which they used to produce their own F₁ hybrids. The USDA breeding program was turned over to R.E. Webb when H.A. Jones retired and the relationship with Texas and Arkansas continued which led to the release of 'Dixie Market' in 1957 by the USDA and Texas AES as well as 'Hybrid 612' in 1961 by the USDA, Arkansas AES and Texas AES. (*ASHS vegetable variety names, 1969*) Both 'Dixie Market'

and 'Hybrid 612' were widely grown in the Texas Wintergarden during the 1960's and early 1970's. 'Melody' was the next major hybrid grown in the area. It was released in 1975 by Royal Sluis Seed Company. 'Melody' was replaced in the late 1980's by 'Fall Green' which was released by the Arkansas AES in 1987. 'Fall Green' was replaced by the 'Samish' Hybrid which was released by Alf Christianson Seed Company in the late 1990's. This variety remained the primary variety through the 2007-2008 production season.

The first reports of an attempt to breed for white rust resistance in spinach are those of E. Mortensen and L.R. Hawthorn in the 1940 and 1941 annual reports of the Winter Haven Experiment Station. About 400 'slightly infected' plants were collected from heavily infected commercial spinach fields throughout the region and transplanted into a special breeding plot and some seed was produced on these 'resistant' plants. (*Texas Agricultural Experiment Station, Fifty-Third and Fifty-Fourth Annual Reports, 1940 and 1941*). What happened to this genetic material is not clear; either seed produced was not viable or the material was lost, or possibly it was incorporated in to the USDA breeding program that was being conducted at the Winter Haven Station in the late 1940's.

In the early 1960's the USDA began breeding efforts to develop genetic resistance to this devastating disease. The effort was a cooperative effort between, USDA, TEXAS A&M University, Del Monte Foods and the University of Arkansas at the Texas A&M University Ag Experiment Substation in Winter Haven. In 1972 the University of Arkansas began its breeding program. The DMF 66-09 became the major white resistant variety for canning which was developed by Del Monte Foods. The University of Arkansas released 'F380' in 1997 and 'F415' in 2005 which were the first publicly available flat leaf spinach varieties with a high level of white rust resistance and 'F154' was released in 2008. For the fresh market 'Ozarka' and 'Green Valley' were released by the University of Arkansas in 1980. These two varieties were highly resistant to white rust. Unfortunately, the initial seed lots made available to growers contained an unusually high number of off type plants causing poor appeal to growers. Alf Christianson Seed Company had been given rights to these varieties. Due to their high level of resistance, Christianson saw merits in these varieties and cleaned up the varieties. They re-released them as 'Ozarka II' and 'Green Valley II' in 1984. They chose to use these names in order to give credit to the University of Arkansas program while indicating that they were improved varieties.' Shortly after their release Christianson developed concerns that they were too similar to justify maintaining both in their product line. Although tests at the Texas A&M University Agricultural Research and Extension Center at Uvalde showed 'Fall Green II' had the higher level of white rust resistance, Christianson decided to promote 'Ozarka II' based on a large seed order for it placed by Herman Ballentine, a large grower/shipper in the Pearsall area. Herman based his request on what he saw in the trial in the Texas A&M test plots. Unfortunately, Mr. Ballentine

was so impressed with the white rust resistance of ‘Ozarka II’ that he left the plots and went to place his order without visiting the rest of the trial. Consequently, ‘Green Valley II’ was not seen. ‘Crystal’, ‘Jewel’ and ‘Wintergarden’ were released by the USDA in 1983. ‘Coho’ was a hybrid released in 1984 by Alf Christianson.

In 1987 the University of Arkansas released ‘Fall Green’ which had the highest level of white rust resistance to this point and ‘Fall Green’ became the dominant white rust resistant variety in the Wintergarden, and for the next 10 years it comprised 90-95% of the fresh market spinach acreage. The release of ‘Fall Green’ was prompted by the observations of Mr. Lawrence Wilde, a Uvalde spinach grower. Mr. Wilde was given a sample of a breeding line from the University of Arkansas by Dr. Frank Dainello, a research scientist at the Texas A&M Center for evaluation under commercial conditions. Lawrence strip planted this line in the middle of a ‘Melody’ field. The ‘Melody’ soon became overrun with both blue mold and white rust while no evidence of these diseases could be found by Lawrence in the Arkansas line. Consequently he immediately called the A&M scientists and told them that they “better get out here and see this!” A local seed salesman, Jim Hester, visited the Wilde trial. What he saw caused him to try and book orders for this breeding line before it had been officially named and released by the University of Arkansas breeder, Dr. Teddy Morelock. Needless to say, the release process was sped up.

The establishment of the Texas A&M University Agricultural Research and Extension Center at Uvalde in 1972 played a major role in the success of spinach production in the Wintergarden, **Figures 26.** The spinach research and



Figure 26 . TEXAS A&M UNIVERSITY RESEARCH AND EXTENSION CENTER - UVALDE

education project at the Center began with the addition of Dr. Frank J. Dainello to its

faculty in 1976. The major focus of Dr. Dainello's work was to conduct problem solving research needed by the spinach industry. The major concerns of the industry were crop losses due to diseases, weeds and the lack of disease resistant adaptable varieties. Dainello implemented an intensive field research program to address these needs, **Figure 27**.

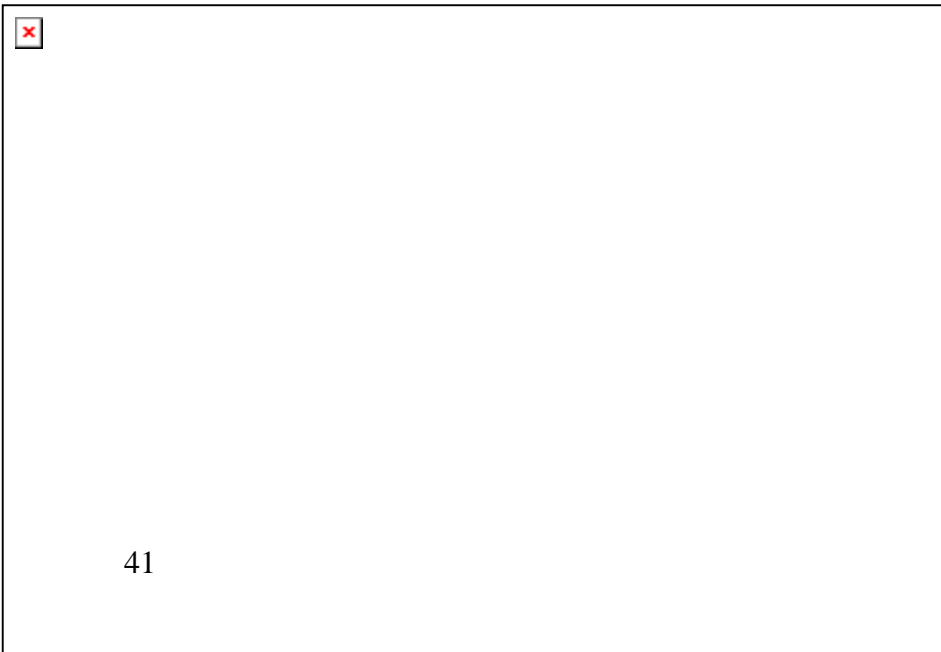


Figure 26 b. Spinach research plots at the Texas A&M University Research and Extension Center, Uvalde.

.Of the above stated problems, disease control, namely white rust, was the most pressing. White rust control was achieved with the use of the fungicide Maneb. The disease control situation was further aggravated with the resurgence of downy mildew (blue mold) in the 1976 – 77 spinach season and the removal of spinach from the Maneb label. The major fresh market spinach varieties in use during the seventies were 'Crystal Savoy', 'Dixie Market' and 'Hybrid 612'. These varieties claimed to have resistance to downy mildew races 1 and 2. Because none of the varieties had resistance to the blue mold infestation, speculation arose concerning the introduction of a new race to the area. In an attempt to find resistance to downy mildew, a disease screening nursery was established at the Uvalde Research and Extension Center in the 1977-78 season. The Texas fresh market industry was and still is based on the production of semi-savoy spinach varieties. The objective of the nursery was to locate high levels of disease resistance in semi-savoy spinach varieties adapted to the area.

Dr Dainello was able to obtain collection of resistant germplasm from Dr. Ray Webb, Pathologist at the USDA Research Facility in Beltsville, Maryland. Although his intentions were good, Dr. Dainello's decision to plant this collection in the designated disease field screening nursery proved to be a mistake on two fronts. One, no seed were held back for farther investigations and, two, white rust overwhelmed the collection before downy mildew resistance could be detected. All was not lost, however. A proliferation of downy mildew throughout the Wintergarden fields resulted in the Del Monte Foods research scientist bringing Dr. Jack Goode, Plant Pathologist-University of Arkansas, to the area to survey the situation. One of their stops was to visit the Uvalde Center nursery. What Dr. Goode saw in the nursery excited him. One hundred percent of the plants in the nursery were severely infected with white rust! The reason for his excitement was that he realized the potential this nursery had as a screening site for the genetics being developed by the University of Arkansas breeding program which began in 1972. Dr. Goode worked closely with Dr. John Bowers, spinach breeder at Arkansas. Based on what he saw, Dr. Goode requested the opportunity to have the Arkansas material screened in this nursery. Unfortunately, it was several years later before Dr. Dainello was able to obtain the Arkansas genetics for screening at the Uvalde Center. Dr. Bowers was in the process of retiring and showed no interest in any cooperative efforts with Texas A&M at this stage of his career. It wasn't until Dr. Teddy Morelock replaced Dr. Bowers in 1984 that a collaborative effort with the University of Arkansas was established.

The results of the first screening nursery did not reveal any clues to resistance available for development of a downy mildew resistant spinach variety. However, they did indicate the tremendous potential for the establishment of a permanent white rust screening site in Uvalde, **Figure 28**.



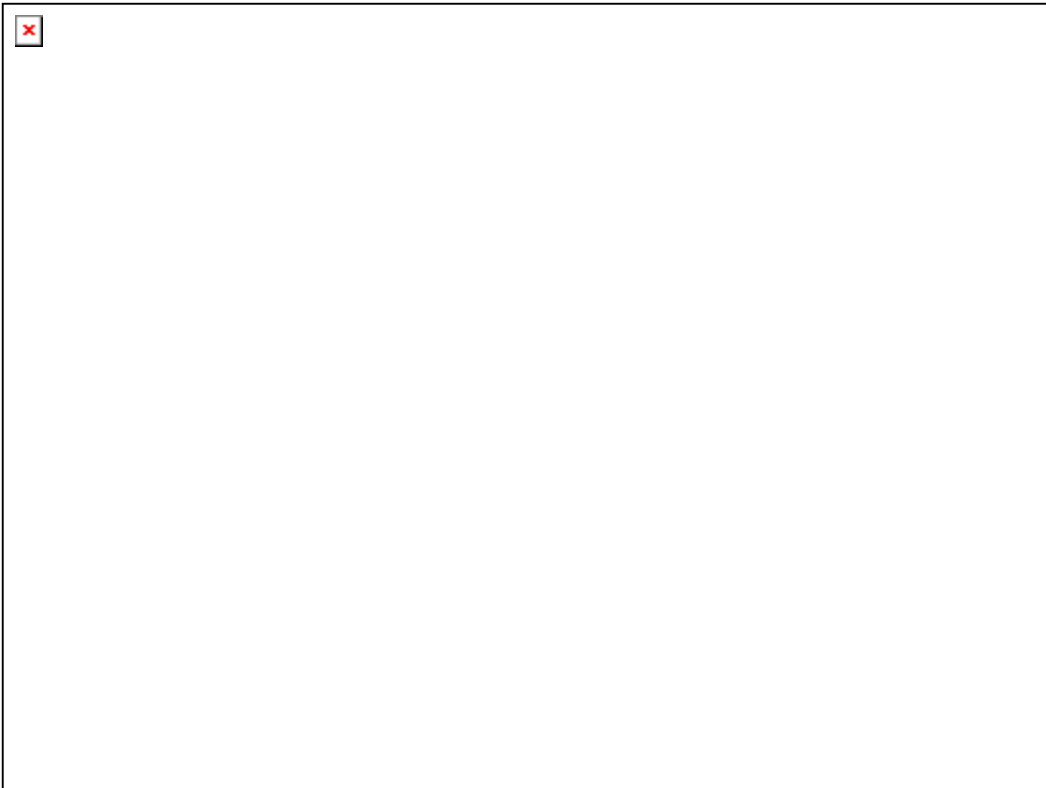
The Alf Christianson Seed Company was the major spinach breeding company in the United States at that time. As a result, Dr. Dainello requested Alf Christianson to submit some of their materials to be evaluated for white rust resistance in the 1978-79 nursery. Dr. Gary Whiteaker submitted five varieties, three of their own and two soon to be released varieties from the University of Arkansas. Of the five entries, only the two Arkansas varieties, 'Ozarka' and 'Green Valley', showed any resistance to white rust. Once again no downy mildew resistance readings were obtainable in this nursery although this disease was becoming epidemic in the area. The reason for this is due to the fact that environmental conditions for white rust are favored earlier in the spinach season than that for downy mildew. Under severe white infestations, not much plant tissue remains available for downy mildew to attack once conditions become favorable for it later in the season. The screening data for white rust resistance submitted to Alf Christianson were sufficient for them to increase their level of participation in subsequent nurseries. In fact, the number of entries that they were sending ultimately led to the establishment a separate section of the screening nursery specifically for their material. Soon after Dr. Morelock's hiring a screening nursery for Arkansas genetics was also established at the Center. As a result Dainello and Jay Schafer, Alf Christianson spinach breeder, developed a close highly productive working relationship leading to the release and introduction of several impact varieties for the area such as 'Coho', 'Samish', 'Ozarka II', and 'Green Valley II' and ACX 5044. The cooperative effort with Dr. Morelock and the Arkansas proved to be a tremendous asset to the Wintergarden Spinach Industry. The release of 'Fall Green' was pivotal to the survival of the industry. It possessed high levels of resistance to white rust. The multi-genetic resistance to white rust in the Arkansas material was found to provide resistance to blue mold as well. Dr. Morelock's lab group found that this characteristic was unique to the multi-genetic nature of their white rust resistance in their material whereas the single gene blue mold resistant material coming out of other spinach programs did not afford resistance to white rust. As a result it was the backbone variety of the area for over 10 years... Dr. Morelock's contributions to the Wintergarden are still evident today. Essentially all of the varieties that have been released since his release of 'Fall Green' being utilized in the Wintergarden contain his Arkansas white rust genetics.

The occurrence of a new downy mildew race in the Wintergarden was confirmed by the results from studies conducted by Dr. Dainello in cooperation with Dr. Roger Jones, Extension Plant Pathologist at the Uvalde Center. They were the first to identify the occurrence of Race III in the United States. After confirming the presence of a new blue mold race in the area these Scientist then established an intensive fungicide screening program to find a replacement for the Maneb fungicide. The results of this effort found that the chemical metalaxyl (Ridomil) could provide field control f or both white rust and downy mildew when used as an in seed furrow at planting treatment. The use of Ridomil in this manner in

combination with the genetic resistance coming out of Dr. Morelock's program was credited by the growers for saving the Wintergarden spinach industry.

CHAPTER VI -CHANGING FACE OF THE FRESH MARKET INDUSTRY

Unfortunately for the Texas spinach industry, the recent industry members have not been as far sighted as some of their predecessors. As a result, rather than being pro active they have been reactive in their production and marketing approach. This led to the steady decline in acreage experienced over the past 20 years. However, change is beginning to creep into the Texas industry more out of necessity for survival rather than out of planned progress. More change has occurred in the Wintergarden spinach production in the five year period from 2003 to 2008 than in the previous 70 years. The innovations implemented by the Ritchies still continue today. Ed Ritchie III, owner and manager of Trio Tres farms, single handedly converted the fresh market spinach industry from hand harvest to machine harvest. In 2003 he purchased a state of the art band saw spinach harvester and began cutting his crop in January, **Figure 29**. The following season, all of the producers in the area converted to machine harvest. Prior to the introduction of mechanical harvesting in 2003, the spinach crop was hand harvested. Increasing production costs and increasing uncertainty over labor supplies led to the rapid adaptation of mechanical harvest of fresh spinach by the industry. To maximize benefits of mechanical harvesters, and due to the increasing consumer demand for smaller leaf



size product, change from the conventional two-bed planting system was needed. As a result wide bed culture has made its way into the fresh market production systems, **Figure 30**. California baby leaf spinach growers are generally credited with the development of the wide bed system of producing spinach.



However, as shown in **Figure 31**, the Del Monte company was using this system in the late 1950's – the early 1960's. It is not known for certain why this practice was abandoned but it is believed that the lack of chemical weed control products dictated that cultivation was needed to control this problem. It is also speculated that the high plant density tended to hold excessive moisture in the plant beds and on the leaf foliage. These conditions were conducive to white rust and downy mildew development. The absence of an effective fungicide and the lack of variety resistance rendered it impossible to provide adequate control of these diseases. Thus wide beds were discarded and the narrow bed system was adopted.

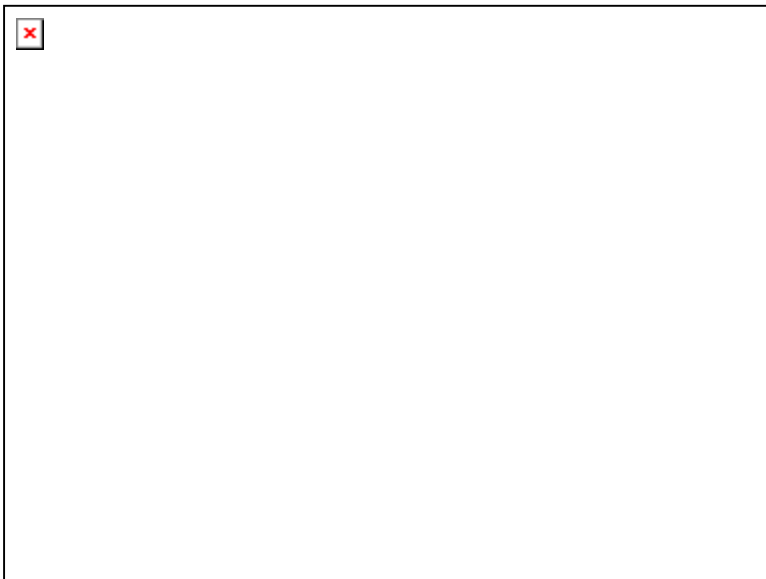
Irrigation techniques have also changed. Wide bed culture has dictated that sprinkler irrigation to be used to supply supplemental water needs. Although some tests have been tried using drip irrigation, the industry is still reluctant to make this change.



The 2006-2007 season saw one of the most devastating events that negatively impacted spinach consumption throughout the US—“The August 19th, 2006 outbreak of E coli 0157:H7 from California baby leaf spinach.” This outbreak resulted in the death of 3 people and hospitalized several hundred. As a consequence, Texas spinach took a severe hit even though no spinach was in the field at the time of the outbreak! It will take a long time to restore confidence in fresh spinach consumption. This was an unfortunate occurrence since it came at a time when spinach consumption was on the rise and when consumers finally had come to realize the great health benefits derived from consumption of fresh spinach. The production, handling and distribution of pathogen free fresh spinach have now become major concerns for the entire food industry.

CHAPTER VII – EMERGENCE OF PROCESSING SPINACH

During the glory years of spinach in the Wintergarden the vast majority of the crop was grown for fresh market with as much as 90 per cent of the total production being shipped out of state. The first mention of processing spinach in the Wintergarden area is that of the Crystal City Canning Company in May of 1933. The plant was managed by S.L. Freed and ran two shifts per day producing 10,000 cans of spinach per day. The plant was located south of Crystal City on the Brundage Highway Ranch Road 65. *(Now and Then in Zavala County - A History Of Zavala County, Texas, 1986)* Part of the old building and the concrete slab it stood on still exists today. **Figure 32.**



In 1941 the Missouri Pacific Railroad submitted a detailed report to the management of the California Packing Corporation in San Francisco suggesting the potential of the Wintergarden as a production area. In 1945 the California Packing Corporation, Calpak, moved to Crystal City and purchased a 22 acre site northwest of Crystal City to build a canning plant. They also purchased 3200 acres of land northeast of Crystal City to develop into a farm to produce spinach for the cannery. The land had to be cleared and plowed before farming operations could start and the first 10 irrigation wells were also drilled at this time. The first spinach grown by Calpak was produced on leased farm land while the purchased land was being prepared for crop production. The leased farms included the Marshall Cometa farm, the Stone farm, the Chinn farm and the Browning farm. *(Now and Then in Zavala County - A History of Zavala County, Texas, 1986).*

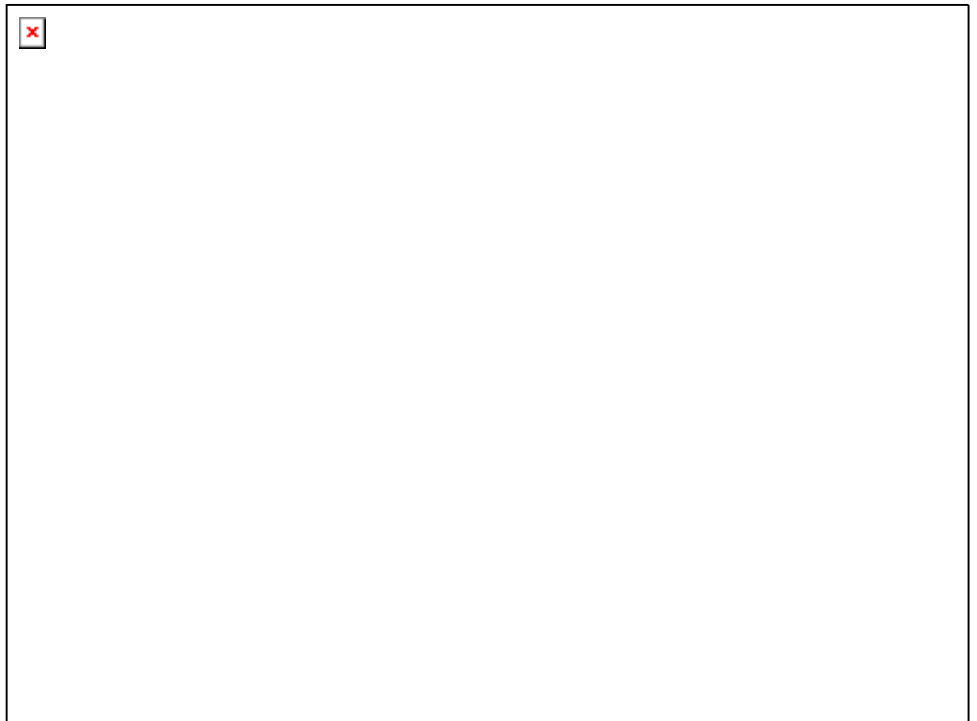
In 1945 a small office was leased in Crystal City to serve as the administrative site for the plant construction and the development of the farming operation. Robert E. Laughlin was in charge of the operation and was later named the Calpak Southwest Division Manager. Robert C. Keswick was the first Division Agricultural Research Manager and later served as Farm Superintendent and conducted the first field research which led to the development of a strong research effort at the Crystal City

site. (*Now and Then in Zavala County - A History of Zavala County, Texas, 1986*). Although the first farming operations were conducted by the Calpak Company they later contracted with farmers for crop production, a system that is still used today to supply spinach for the Crystal City canning plant.

The first spinach was planted in September, 1945, and the first spinach was processed at Crystal City on March 13, 1946 in the new canning plant, now known as Del Monte Foods. A small planting of pole beans was canned later that spring making Crystal City a two product division rather than just a spinach plant as it was supposed to be. In 1951 beets were added which were followed by carrots and new potatoes. A story appearing in the May 28, 1947 Sentinel indicated that 361 carloads of canned vegetables had been shipped from Crystal City since last June. The article stated that canned vegetables were shipped in every month of the year with the highest loads rolled out in March (77 loads) and the smallest loads (8) in November. However, they did not give a breakdown on what percent of the loads was spinach.

Several additions have been made to the Crystal City processing plant over the years. In February 1958 a can manufacturing facility was added to the Crystal City plant. In 1979 a new root crop building was added and in 1981 a major warehouse addition was constructed. In 1982 the capacity of the can plant was doubled to meet the increased demand for containers (*Now and Then in Zavala County - A History of Zavala County, Texas, 1986*). The Del Monte canning plant in Crystal City remains a major contributor to

the economy of the Wintergarden region and the largest employer in Crystal City. **Figure 33.** Since the company packed its premium brand under the Del Monte label in 1967 the California Packing Cooperation assumed the name of its' premium label and became the Del Monte Company that we know today. Without the



presence of Del Monte, it is questionable whether or not Crystal City would exist as it does today.

White rust is also a major concern process spinach production. The success of Del Monte's spinach production is attributed to the use of their proprietary varieties developed in house by their breeders. No other flat leaf processing varieties were available at that time from independent seed companies. As a result they had a competitive edge on all other processors attempting to produce flat leaf spinach in the region. The source of the resistance in their flat leaf processing varieties originated in the early 1960s from the genetics developed in the cooperative efforts with USDA, Arkansas and Texas A&M.

A canning factory was built in Eagle Pass in the early 1950's. Eagle Pass Food Products, Inc. canned spinach and several other vegetables (*Canners Directory – National Canning Association 1949, 1950, 1953*). The 1955 canners directory does not list a canning operating in Eagle Pass so it appears the Eagle Pass Food Products, Inc. did not last but a short time.

In 1982 a group of producers started a freezing plant in Uvalde located on the west side of town on Hacienda Road (Farm Road 2369 W). The Frio foods plant froze product from about 300 acres of spinach annually as well as several acres of greens,

Figure 34. The plant eventually sold to Dean Foods and was closed in 2004 (*personal communication, Lawrence Wilde*).



Figure 34. Former Frio Foods frozen spinach plant, Uvalde, TX

Through the years Wintergarden spinach was shipped to other areas in Texas as well as other states to be canned or frozen. Spinach is still shipped from the area today to freezers in the Rio Grande Valley of Texas and to a canner in Arkansas.

It is speculated that there were many more processing facilities in the Wintergarden than reported in this publication due to the fact that the lack of widespread refrigeration available in the 1920s and in the 1930s. Canning was the most effective means of preserving food and making it available for

widespread distribution. Unfortunately the records of these operations are limited due to the confidentiality of the privately owned companies.

CHAPTER VIII - WINTERGARDEN SPINACH PRODUCERS BOARD

One of the most significant events to occur in the recent history of the Wintergarden spinach industry was the formation of the Wintergarden Spinach Producers Board. The Board was formed with the specific intent of establishing a mechanism to provide funding for research and education needed to solve the industry's pressing problems. Dwindling State funding for such purposes had led to a reduction in such activities in the Texas Agricultural Experiment Station and the Texas Agricultural Extension Service. Dr. Dainello recognized this situation soon after his joining the faculty at the Uvalde Center. Attempts to develop such a mechanism in the early eighties met with defeat. However, approximately 20 years later, weed control became a dominant problem for processing growers using machine harvest. Sorting weeds from harvested spinach at the processing plant was escalating production costs for both the processor and the grower. Grower fields were getting rejected due to excess weeds even though herbicides were applied and hand weeding crews were used to reduce the weed population. Increasing weeding bills also began to plague the fresh market growers as well. The proliferation of the weed problem was due to lack of effective chemical compounds. The most effective herbicide used in spinach production at the time, VegeDex, was removed from the market place for economic decisions on the part of the manufacturer. Other effective products were banned by the EPA. Other factors that interacted to enhance weed buildup were: increasing use of machine harvest and number of machine harvests per field; favorable weather patterns for optimal weed growth, and, the extensive use of herbicides on agronomic crops being rotated with spinach.

The growing weed problem was loudly expressed by growers at an Extension conducted spinach production meeting held at the Uvalde Center during the 1994 – 95 season. They were calling for new products and information that would help with this problem. Dr. Dainello took this opportunity to point out that there was a product available that would help with the problem but that Texas was not approved for its' use. Research conducted at the Uvalde Center in 1983 – 1984 found that the product Dual was effective in controlling weeds in spinach. However, the manufacturer was not interested in registering this product on spinach. Renewed field evaluations of Dual by Dr. Larry Stein et al at the Del Monte Research Farm near Crystal City again showed promise for this product. Other states were able to obtain use permits for Dual via a process called 3rd Party Registration. Crops that had commodity groups providing funding for research to collect residue and efficacy data and were willing to assume the requirement of 3rd Party Registration were successful in getting products approved even though their crops were of limited interest to the chemical companies. Dainello once again stressed the need for such a spinach commodity group in the Wintergarden that would enable research and extension activities

leading to getting chemicals approved. If spinach had such a group, the possibility of getting Dual cleared would greatly increase. The ensuing discussion on this topic led to the agreement for the need of another meeting specifically for the purpose to determine the interest and merits of forming a spinach commodity group.

On May 1, 1995 a meeting was arranged by Mr. Kenneth White, CEA-Ag for Uvalde County. A proposal drafted by Dr. Dainello called for the establishment of a commodity referendum for the purpose of establishing a spinach board and a check off system to raise funds for spinach research and education. Dainello stated the benefits derived from a strong research program conducted in the past at the TAMU AREC @ Uvalde led to the development of the white rust management strategy currently in place as well as Ridomil use patterns for disease control and Ro-Neet for weed control. The draft was presented and discussed. The discussions of the attendees resulted in an agreement that a need existed to proceed with the formation of a spinach board and to conduct a referendum election to establish the board and a check off system. The attendees at this meeting also voted on an acting board to function as the steering committee for the referendum. It was comprised of: Don Laffere, Acting Chair, Jimmy Phillips, Jimmy Crawford, Ed Ritchie III, Lawrence Wilde, and Bart Wagner. Because passage of the referendum would establish a semi-official taxing group, certain legal procedures needed to be followed. A subsequent meeting with the Texas Department of Agriculture provided the legal requirements and outlined the path to follow for the referendum. In order to conduct a referendum it was learned that a sponsoring organization was needed. Mr. Ray Prewett, Executive Director of the Texas Produce Association volunteered his group to provide this function. After several area wide meetings to generate support for the referendum, an election was held in early September, 1995. Votes were canvassed on October 2, 1995. The results were unanimous approval. The Wintergarden Spinach Producers Board was established and an annual check-off of one cent/bu of harvested fresh market spinach and 25 cents/ton processing spinach would be paid by the grower and matched by the shippers and processors of the product. Since the inception of the check-off system, \$15,000 – \$30,000 has been raised annually. The funds were distributed to scientists based on proposals submitted to the board in response to needs ranked by the board. It is through the foresight of the Wintergarden spinach producers and their board that spinach research and educational activities have been able to provide the information needed to insure continued successful spinach production in the region.

CHAPTER IX - THE FUTURE: Industry Death, Survival, or Growth and Expansion

What the future holds for the Wintergarden Spinach Industry lies in the answers to the following questions: Are the current industry leaders willing to make the commitments necessary to insure survival for growth and expansion, and, do these individuals have the passion and foresight exhibited by their ancestors in meeting the challenges of their era? If the answer to either of these questions is NO then the industry is doomed to a slow painful DEATH! If the answer to both of these questions is YES then survival and growth and expansion can be a real possibility. The Wintergarden still has all of the factors and conditions in place that once enabled it to become the premier spinach production region in the US: a long, optimum growing season; an adequate supply of high quality water; an abundance of relatively inexpensive, prime farm land; access to a skilled labor force, proximity to N/S and E/W interstate and railroads, and seaport; half the distance nearer to the Northern and Eastern markets currently supplied by California; and, a knowledgeable and highly competent group of spinach growers. When these are combined, the region should be primed for a comeback as a major spinach producing region. All that is currently missing is entrepreneurship and state of the art packing, processing and shipping facilities. Nothing a little money cannot fix!

APPENDIX

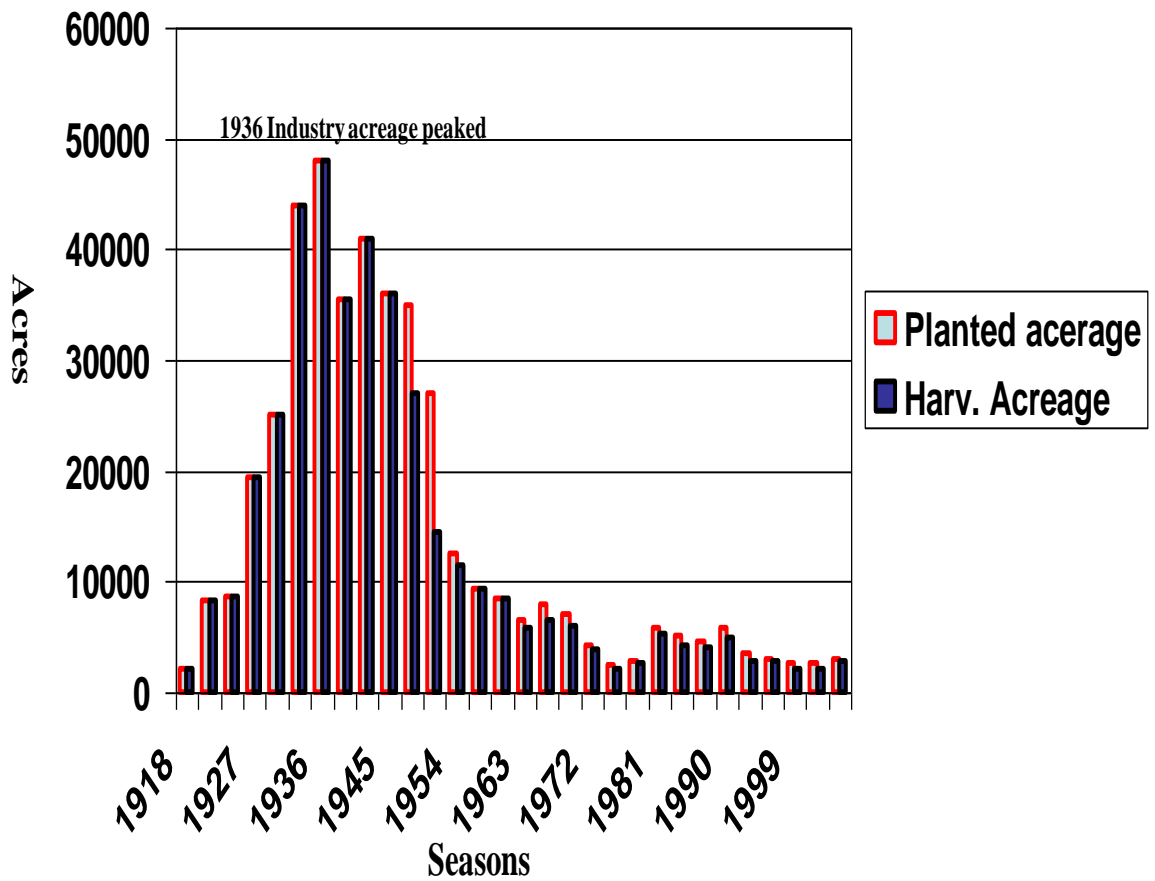
- Table 1. Spinach acreage for selected states. p. 39.**
- Graph 1. Texas fresh market spinach acreage: 1918-2005. p. 40.**
- Graph 2. Texas fresh market spinach price received: 1918 – 2005. p. 41.**
- Graph 3. Texas fresh market spinach average yield per acre: 1918-2005. P. 42**
- Graph 4. Texas fresh market spinach total volume produced: 1918-2005. P. 43**

Table 1. Spinach Acreage for Selected States

<u>Season</u>	<u>US</u>	<u>AZ</u>	<u>CA</u>	<u>TX</u>
1929	58,110	148	10,884	15,221
1939	69,255	145	6,684	22,002
1949	86,915	164	7,900	33,164
1954	48,792	109	9,312	11,993
1959	47,678	35	9,738	8,484
1964	40,791	66	7,890	9,724
1969	34,113	45	7,937	5,921
1974	30,885	49	9,890	5,392
1978	33,031	278	12,573	6,648
1982	34,915	341	8,491	8,655
1987	36,445	192	10,558	7,991
1992	40,583	1830	12,266	7,560
1997	41,861	2,518	17,723	6,104
2002	49,859	4,099	28,017	3,840
2005	56,400	6,000	34,800	2,100

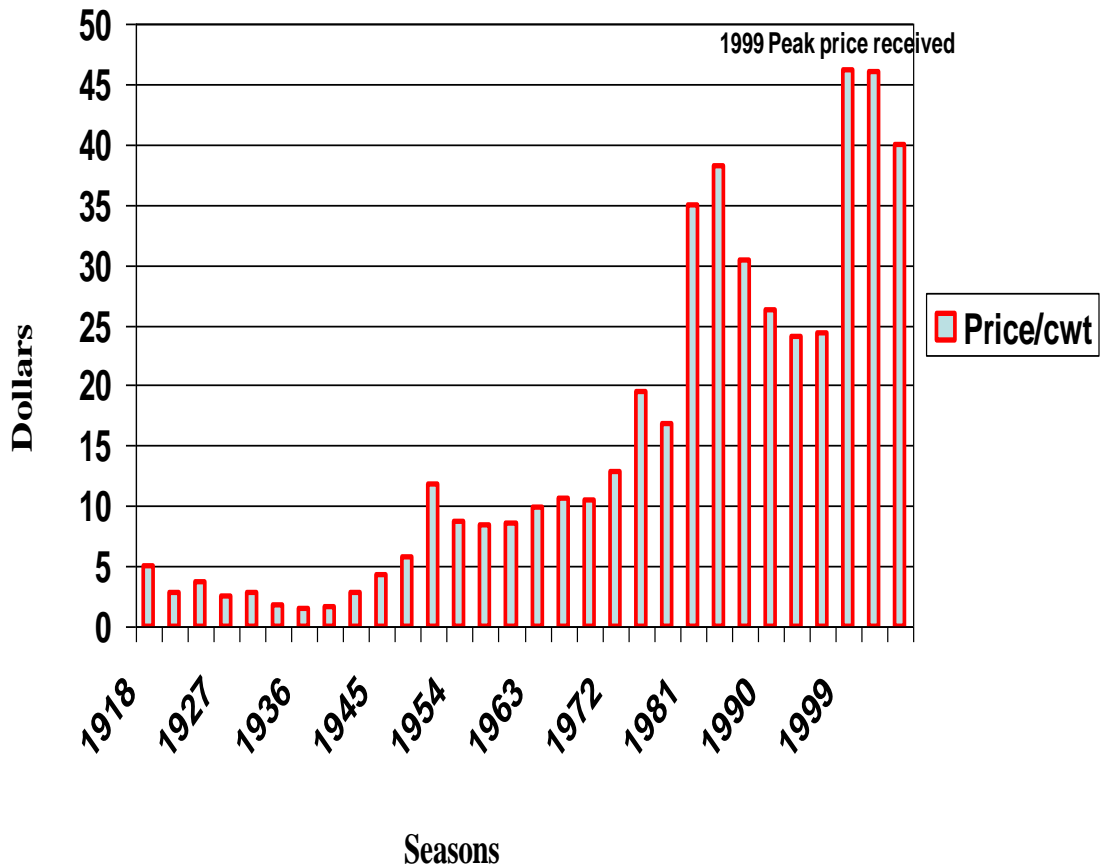
SOURCE: U.S. CENSUS OF AGRICULTURE

Graph 1: Texas Fresh Market Spinach Acreage: 1918-2005

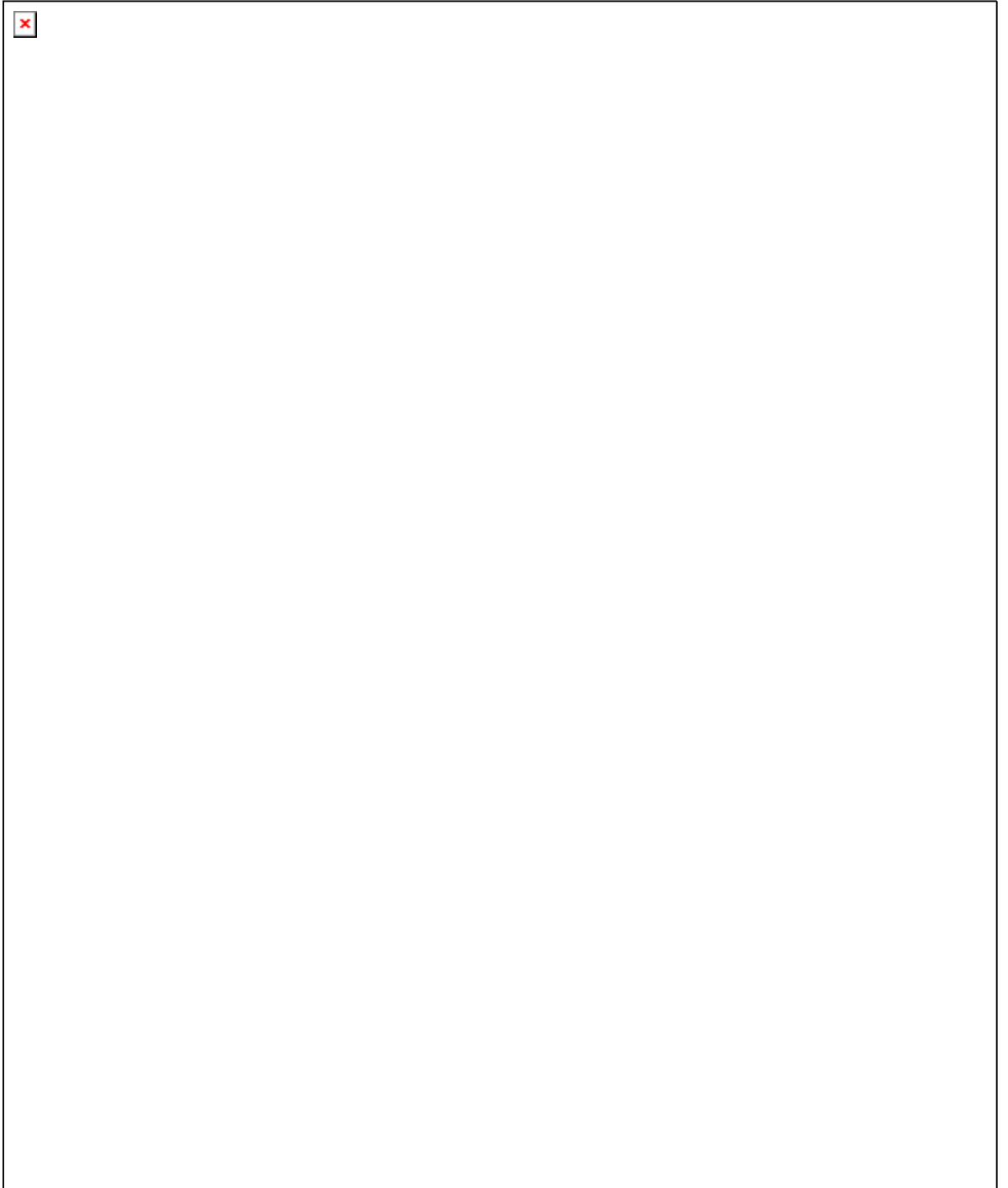


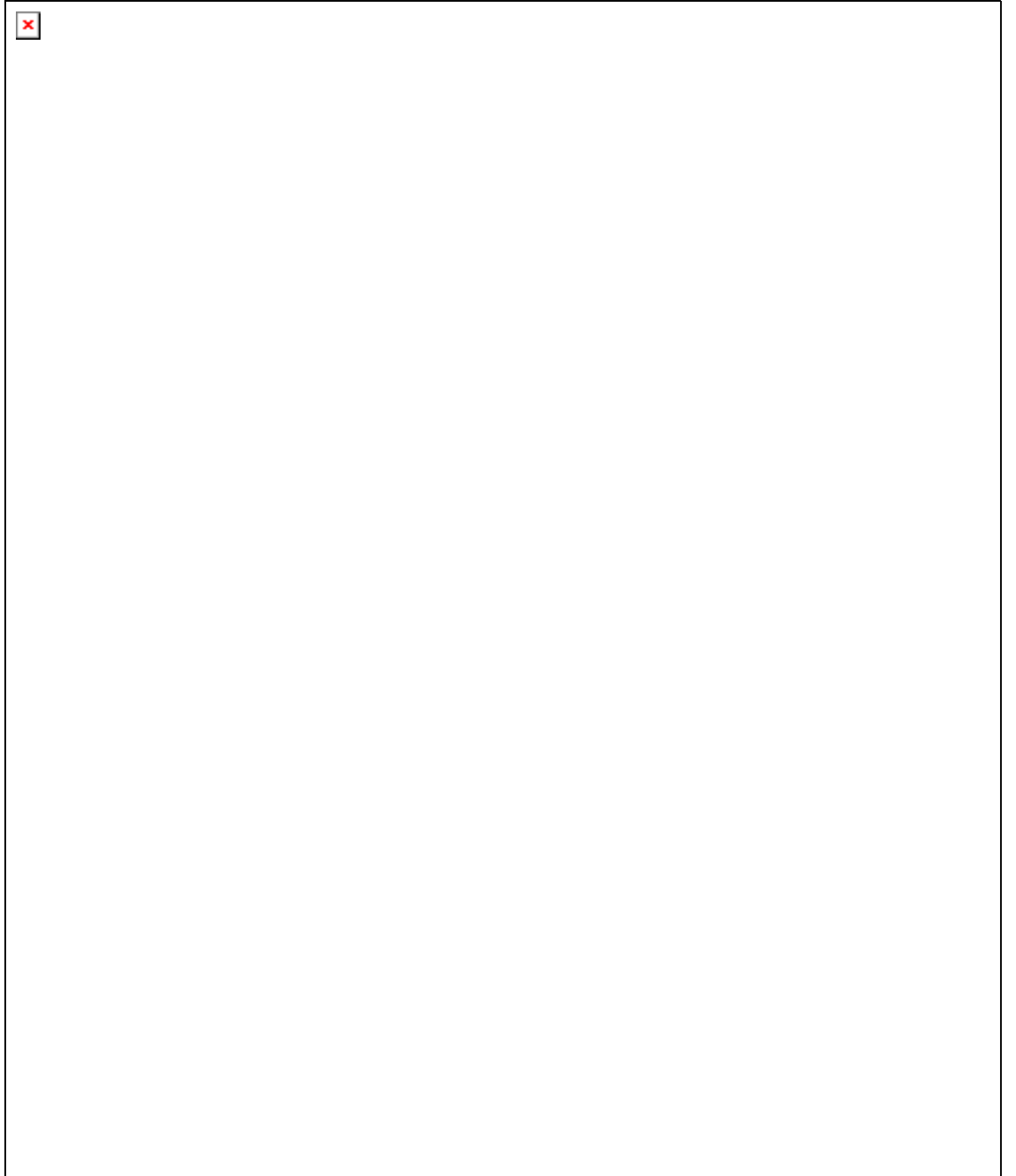
Source: Texas Historical Crops Statistics (1866-1989)
 USDA Commercial Vegetables for Fresh Market(1993-2005)

Graph 2: Texas Fresh Market Spinach Price Received: 1918 -2005



Source: Texas Historical Crops Statistics (1866-1989)
 USDA Commercial Vegetables for Fresh Market(1993-2005)





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