# THE TEXAS ONION

## ONION INDUSTRY

THESIS FOR DEGREE OF M. HORT.

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THESIS

# THE TEXAS BERMUDA ONION INDUSTRY.

There is a very small amount of available literature concerning the Bermuda onion industry of Texas, therefore the aim of this thesis is to furnish information about the history, location, extent and present methods used rather than an attempt to give detailed instructions concerning the best cultural and marketing methods. The writer has been in the growing sections during two harvesting seasons and was impressed with the magnitude of the crop.

Practically all of the Bermuda onion growing regions in Texas are south of a line drawn east and west through San Antonio. The largest percentage of the crop is grown close to the Rio Grande river. Normally about one half of the total acreage is grown at Laredo, Texas. Other important shipping points named approximately in the order of their importance are Asherton, Crystal City, Cotulla, Mission, Carrizo Springs, Pearsall, Big Wells, and Corpus Christi.

During the season of 1916 five thousand carloads of 464 bushel crates each or 2,320,000 bushels were shipped out of the Texas territory. These onions were shipped from March 25th to June 1st, inclusive, The F.O.B. price averaged approximately one dollar per crate. The total Texas acreage in 1916, according to the United States Bureau of Crop Estimates, was 10,057, this being the largest acreage of onions accredited to any state in the Union. The April 1st 1917 estimate places the acreage at 12,050 and the yield at 2,964,300 bushels or about 6,300 carloads. While there are no complete figures on the total onion crop in the United States it is estimated that the Texas Bermuda onion crop constitutes about twenty percent of the total production.

History:-

The Bermuda onion industry is relatively young in the state of Texas, having its inception at Cotulla about 1897. A few of them were

grown there by using a well and windmill as a means of irrigation. The grower was so successful in growing and marketing them that, the following year,he secured seed for a larger acreage and planted them on land where better irrigation facilities were available.From this time the industry grew by leaps and bounds until,at present, these onions constitute the main cash crop of the above mentioned irrigated area.

Varieties:-

Varieties of Bermuda onions mentioned in available literature are the White Bermuda and the Red Bermuda.The red variety is not grown commercially in Southern Texas.The White Bermuda variety is really yellow in color and in the growing sections they are commonly spoken of as "yellows".This White(yellow) variety usually constitutes about 75 percent of the total acreage.The other variety grown(Crystal Wax), commonly called "wax",is pure waxen white in color and very attractive in appearance.The wax variety usually brings the highest price during the early part of the shipping season and is preferred in the western markets.They require careful management during the maturing,harvesting and marketing season.The yellow variety is preferred in the eastern markets.

Another onion which seems to be gaining a foothold in the Texas territory is the Spanish Denia.While Bermuda onions are typically flat the Denias are about the shape of the Yellow Globe.They are planted at a time when the Bermuda varieties are nearly ready to harvest. They are harvested in August.

Seed:-

Up to the present time practically all of the Bermuda onion seed has been obtained from Teneriffe,in the Canary Islands.The seed is

harvested there in July and is received in this country fron August 15th to September 15th.During the fall of 1916 there were 37,000 pounds of Teneriffe seed sold in this country of which 30,000 pounds were of the yellow variety.Besides this there were 15,000 pounds shipped from Riverside and Imperial counties,California.California seed seems to be growing in popularity and it is predicted that in a few years all of the seed used in this country will come from California.Factors which are making the California seed more popular are the uncertainty of obtaining the Teneriffe seed in time for planting,the import duty, and the tendency of the foreign grown seed of the yellow variety to become mixed with the red variety by cross pollination,thereby procucing a large percentage of pink onions in the yellow stock.California seed can also be delivered earlier than that which is imported.

Seed beds:-

Bermuda onion plants have to be grown in a seed bed and transplanted(Fig.5).This seed bed is placed on the best and most friable soil after careful preparation.Soil with a small amount of humus or soil which puddles or bakes readily is not used for seed beds. With good viable seed two and one half to three pounds will produce enough plants for an acre.There seems to be a difference of opinion as to the best time for planting the seed which varies from the middle of August until the first of October.Most of the seed is planted from September tenth to twenty fifth.There is a tendency for the growers to attempt to produce an early maturing crop by planting their seed early.In some years they are successful but it seems to take a certain amount of warm weather to mature the crop,and as this warm weather usually does not arrive until early spring,there seems to be little advantage in early planting.During the 1917 season the early

plantings ended disastrously as two early frosts caught them at a critical stage and the plants produced a large percentage of seed heads instead of good marketable onions.

Seed beds are laid off in borders about fifteen feet from center to center and fifty to one hundred feet long,depending upon the amount of fall or slope in the land.Rows are planted about 12-13 inches apart. The beds are well levelled so that there are no low nor high spots where the plants are either drowned or suffer from moisture.

The seed is drilled in straight rows,using 25 to 30 pounds per acre of seed bed.It is planted from one half to one inch deep depending upon the nature of the soil.As soon as the seed is planted the ground is irrigated and the surface of the soil is not allowed to form a crust until the young plants are through the ground.After the plants are above the surface they are cultivated frequently.The beds are irrigated often enough to keep the soil moist and the plants growing vigorously.A steady even growth is necessary to produce plants which will result in a uniformly high grade of onions at harvesting time. About two irrigations are necessary to germinate the seed properly and two others to bring the plants to proper size for transplanting. The seedlings reach transplanting size from fifty to seventy days after planting the seed.

Preparation of land-

All land used for onion growing in south Texas was originally covered with prickly pear or cactus,mesquite and other plants indigenous to arid countries(Fig.1).Therefore one of the first operations necessary in preparing new land for the crop is to clear it. After the land is cleared an adequate water supply is provided.In the Laredo section the water is all pumped from the Rio Grande river by the use of large gasoline engines and powerful pumps. A few farms are

so far distant from the river that a "second lift" or second pump has to be installed in the line.Some of the irrigation systems use underground pipes for carrying the water to a higher level and others use flumes(Fig.2).In either case outlets are placed at convenient intervals so that the water can be diverted into the open irrigation ditches. It is also quite common to pump into large reservoirs which are situated on a high elevation(Fig.4). The water is distributed into the ditches from the reservoir by means of gravity(Fig.3).In the onion districts north of Laredo the water is supplied mostly from artesian wells.Most of these artesian wells have ceased flowing and pumps have to be used.

A few onions are grown on small ridges and the irrigation water run between each row but the largest percentage of the crop,especially in the Laredo section,is irrigated by what is known as the border flood system(Fig.7).The "borders"are made by throwing up a ridge of soil eight to ten inches high and about twelve to eighteen inches wide. These ridges of soil are made parallel to each other and placed so that they contour the surface of the land. The end of each border is next to an irrigation ditch where the water can be turned in to flood the soil included between the ridges. It is the aim to have a nearly level surface in each border so that the water will flood over the surface evenly.The borders are built 75 to 100 and even 150 feet long, depending upon the contour of the land.

Only one border has been described but it should be understood that all of the surface of the soil is covered with borders except for the area taken up by irrigation ditches.

Transplanting:-

As has been mentioned all of the seed is planted in specially prepared beds and the seedlings are taken up and transplanted.When

the seedlings are about one eighth to one quarter of an inch in diameter they are taken up and the tops and roots trimmed before they are transplanted.Many of the most successful growers "cull" the plants before they are set out,taking out the small and inferior looking plants. Growers who do this claim that a much better grade of stock is obtained at harvesting time than when all of the plants are used.The writer has noted crops where the plants have been graded and found the above assumption to be true.Where this culling of plants takes place, ten to twenty five percent of the plants are discarded. However this practice is limited in extent and most of the growers plant the seedlings as they come from the seed bed,maintaining that labor is too scarce,that it costs too much and that it is impossible to transplant a large acreage when the plants are culled.

Rows are marked off in the border about a foot apart and the seedlings are distributed along the row.The laborer,equipped with a small dibble, makes a hole in the ground,places the plant and forces the soil around it.They are planted three to four inches apart in the row and one to one and one half inches deep.As soon as the border is planted(Fig.6) it is given an irrigation and within a few days the young plants have thrown out new roots.

Cultural methods:-

No detailed description of the cultural methods will be given as they do not differ widely from other truck crops.A steady even growth is the aim of the onion grower.Any severe check in the growth results in forming a large percentage of splits,doubles and seed stems at harvesting time.During the 1917 season there were two rather severe late frosts which resulted in producing about fifty percent of seed stems in some crops. An even growth is accomplished by proper irrigation,fertilization and cultivation. The rows being planted close together,cultivation has to be done by hand and much hand weeding is

necessary. Yields vary from 100 to 700 crates per acre but an average yield is 250-300 crates per acre(Fig.15).

Harvesting:-

During the growing as well as the harvest season Mexican men, women and children are the only laborers available,It is doubtful if the industry could thrive as it does without this cheap and plentiful supply of labor.They are paid fifty to seventy-five cents per day, although the Mexicans prefer contract work.

When the Bermuda onion is ready to harvest the tops begin to fall over. The maturity also can be judged by determining if the necks are soft to the touch rather than having the turgid feeling of a growing plant. The most of the top of the onion is green when it is dug but a large percentage of the tops have fallen over.Some growers try to hasten maturity by rolling down the tops but this is not practiced by the best growers.

The onions are plowed out with a "Georgia stock" or "scooter.The mule walks along the side of the row and the plow is run under the bulbs so that each one is loosened by lifting.The plows are immediately followed by laborers who shake off some of the adhering soil and throw the onions from two borders together in a windrow(Fig.9&10).If the tops are somewhat green and the weather is not threatening rain,the grower may allow them to lie in the windrows for a few hours or a day to dry out before clipping off the tops.If clipped too soon after digging, when the tops are green,they bleed and are not dry when placed in the crates.But if left in the hot sun too long there is danger of sunburn. The common practice is to"get the onions out of the ground" as fast as possible when the harvest season begins.The growers always are afraid that it is going to rain and harm the crop.Therefore it is usual to begin clipping as soon as they are plowed out and in windrows.

Onions which are plowed out in the morning usually are in the cars by nightfall.Clipping,which is done by hand with common sheep shears,is accomplished by contract labor,and costs from two to four cents per crate according to the nature of the crop and the supply of labor. The onions are clipped on the ground and picked up into crates(Figs 11&12).

As soon as the onions are clipped and when the atmosphere is dry,they are cleaned.The cleaning is accomplished by pouring a crate of onions upon a piece of gunny sacking about 3½ feet wide and 6 to 8 feet long (Fig.17).With a laborer holding on either end of the gunny sacking, they are "shuffled" endwise and sidewise a few times.This cleaning is done to remove any adhering soil and the coarse,outside,loose layers of skins or hulls.If carefully done when the onions are dry it leaves the stock in a bright clean condition.Careless laborers often cause an unnecessary amount of bruising in this operation.

Grading:-

As soon as the onions are cleaned they are graded.Some growers do this by running them over a V shaped table with a slatted slanting bottom.The onions are poured in at the top end of the table and worked down to the lower and narrow end.Laborers stand on either side of the table and pick out the culls and small stock,allowing the best stock go into the crates at the lower end.The table is very similar to those used in many of the apple producing sections.

Most of the so called grading is done by pouring them on the ground as they are cleaned and sorting them as they are picked up into crates(Fig.16).

In the past a very small amount of effective grading has been done.It is the practice to separate the splits,poor doubles,bottle necks and small stock from the medium to large stock.No onions are thrown away as they are all placed into two "grades".The standard of these grades

varies in the different fields and with different growers.

In order to standardize the grades which go on the market the Office of Markets and Rural Organization of the United States Department of Agriculture has been conducting investigational work during the past two seasons.The aim has been to find standards (Fig.18) which are practical from the growers and market viewpoint in order to provide a basis for bargaining and to eliminate confusion in the marketing.As a result the following grades have been recommended for the 1917 shipping season.

Grading rules:-

Standard Jumbo Grade-
Shall consist of onions of one variety,well-shaped,mature,clean,dry,bright,free from damaging bruises and sunburn and over 3½ inches in diameter.

Standard No.1 Grade-
Shall consist of onions of one variety,sound, well shaped,mature,clean,dry,bright,free from damaging bruises and sunburn; not less than two or over 3½ inches in diameter. Onions shipped under this grade shall not include over 5 percent by weight of jumbo,5 percent by weight of number two or 2 percent by weight of boilers shall be allowed in this grade.Provided,however,that the total tolerance shall not be over ten percent by weight for noticeably pink,jumbo,number two,boilers or other onions below the foregoing specifications.

Standard No.2 Grade-
Shall consist of onions of one variety,sound, mature,dry,free from damaging bruises and sunburn; not less than two or over 3½ inches in diameter.Except for the tolerance this grade shall not include doubles,splits,bottle necks and seed stems.Yellow onions shipped under this grade shall not include over ten percent by weight of onions which are noticeably pink.Not over 5 percent by weight

of jumbo,5 percent by weight of boilers,5 percent by weight of number 3 shall be allowed in this grade.Provided,however, that the total tolerance shall not be over 15 percent by weight for noticeably pink, jumbo,boilers,number three or other onions below the foregoing specifications.

Standard Boiler Grade-

Shall consist of onions of one variety,sound,well shaped, mature,clean,dry,bright,free from damaging bruises and sunburn and from one to two inches in diameter.Not over 5 percent by weight of any other grade shall be allowed in this grade,

Standard No.3 grade-

May include doubles,splits,bottle necks,seed stems and any sound and marketable onions not included in other grades.

Interpretation of Terms:-

"One variety".They must be of the Crystal Wax,White(yellow) Bermuda or Red Bermuda and not a mixture of these types or varieties.

"Mature".The onions shall be fully grown and firm--not partly grown and soft nor what might be termed fully or dead ripe.

"Sound". Stock must contain no watersoaked,decayed or otherwise unsound onions.

"Well shaped". Not having the appearance of being three,four or five sided,Onions round enough so that the general appearance is round. Need not be of the exact flat Bermuda type,but shall not include thick necks,bottle necks,or seed stems.

"Clean,dry,bright". Practically free from soil or dirt,free from excessive moisture and have an attractive lustre.

"Noticeably pink" Refers to stock with a conspicuous pink color often found in the yellow onions.Those which are not pink enough to detract from the market value shall not be excluded.When more of this

noticeably pink stock is found than is allowed in the tolerance it shall be graded out as a distinct variety. Red Bermuda onions found in stock of the White(yellow)Bermuda onion variety are excluded by the specification "one variety".

Packing-

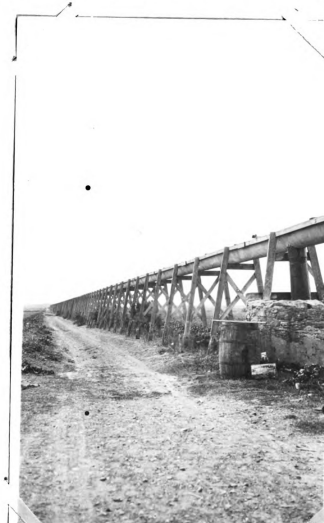
The "Cummer" type of crate shown in Figure 17 is used almost exclusively.These crates hold about fifty pounds of onions.The onions are placed in the crates as soon as graded,the cover put in place and the ends driven down and clinched.

Marketing-

The marketing of Texas Bermuda onions is accomplished like many other perishable crops where there is no organization of the growers. Produce firms send in representatives to buy what they need for cash if it is impossible to get them on a consignment basis.Some carlot distributing firms handle on a commission basis.Growers with large acreages may find a market for their own product either by means of orders from produce firms or by shipping on consignment.Some growers contract to market their output through a distributor,being able thereby to get an advance while growing the crop.Speculators also buy a large amount of stock.

During the past two seasons the United States Office of Markets has established a market news service for the benefit of the growers and shippers.This has been a material help in the distribution of the crop.

1. Showing the nature of the land before clearing.



2. An irrigation flume.

3. Turning water into an irrigation ditch from the reservoir shown below.

4. A reservoir for irrigation purposes.

5. The seed bed as it appears before transplanting.

6. Seedlings just transplanted. Note the way borders are made.

7. Method of flood irrigation.


8. A well grown crop of onions about ready to harvest.

9. Plowing out and throwing the onions in windrows

10. As they appear after digging.

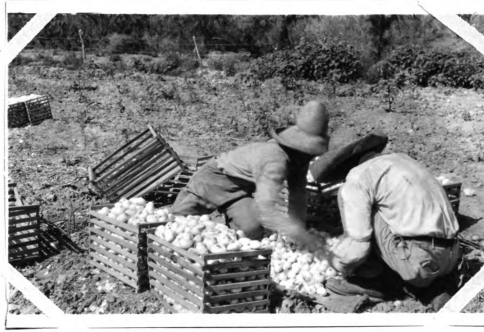

11. Clipping the tops and roots.

12. Onions clipped and picked up into crates.

13. A busy harvesting scene.


14. Large field partially harvested.


15. A yield of about 500 crates per acre.



16. Grading onions from the ground,
The most common method.

17. Running onions over a sizing machine. Note method of cleaning with piece of gunny sacking.

18. Grades from left to right: No. 3, "picklers", boilers, No. 1, and jumbo.


19. Loading into cars for shipment.