

## MARKETING NORTHERN KENTUCKY TOMATOES

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## Introduction

The production of tomatoes in the three northern Kentucky counties, Boone, Kenton, and Campbell for the fresh vegetable market in Cincinnati has long been an important source of income on some of the farms. During 1949, for example, 223 farmers in these counties raised nearly 300 acres of tomatoes for sale in the metropolitan area. Producers in these counties follow two practices in producing tomatoes. The largest proportion raise the main crop of tomatoes which is marketed from early July until late August. About 75 percent of the acreage in 1949 was devoted to this crop. The remainder of the acreage was utilized to produce a late crop which is marketed from mid-September until frost.

In Trimble County, some 50 miles to the southwest, but within easy marketing distance of the Cincinnati market, 163 farmers produced 629 acres of tomatoes in 1949. Most of these tomatoes are marketed from mid-August on. The largest part of the crop is sold to a canner, but in recent years a goodly proportion was harvested in the mature-green stage and sold to prepackers for tubing purposes. The bulk of these tomatoes were purchased by truckers who take them south for ripening and packing. Some of this crop might be used by the prepackers within the area if they were properly harvested and handled so as to meet the requirements of local packagers.

## The Early Crop

Present Marketing Methods. The early crop of tomatoes in the Northern Kentucky counties is largely marketed in one of two ways, either in one-half bushel baskets or in 10-pound cardboard baskets. Those producers selling on the farmers market or directly to wholesale dealers have been selling in the one-half bushel baskets, while those producers selling through the Cincinnati Produce Growers Association used the 10-pound cardboard baskets.

Central packing of the 10-pound cardboard baskets by the Cincinnati Produce Growers Association was abandoned several years ago and since that time each member packs the tomatoes in the 10-pound baskets on the farm prior to delivery to the sales agent. Few producers endeavor to put up a pack that would meet the requirements of the U. S. No. 1 Grade. Instead, most producers pack what is classified as a "combination grade" which permits 70 percent U. S. No. 1's and 30 percent U. S. No. 2's with a tolerance of 10 percent in either grade. Although the Association has endeavored to have producers standardize packs, each producer has his own ideas on how to pack, consequently the Association does not have a standardized product to sell.

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Lack of Standardization Limits Market. The lack of a standardized pack or of a pack meeting the U. S. No. 1 Grade requirement has restricted the market for home-grown tomatoes. In fact several of the largest buyers distributing fresh vegetables within the metropolitan area use shipped-in tomatoes to meet the largest share of their requirements even during the height of the local tomato season. Also some out-of-town buyers, normally in the habit of purchasing graded tomatoes, prefer to buy U. S. No. 1 Grade because they know what they are getting.

The Problem. The problem with the early crop was to find out if well-graded tomatoes packed by the Association for uniformity into U. S. No. 1 and U. S. No. 2 Grades would sell for sufficiently higher prices so that the net returns received by producers would be greater than that received by them from the sale of farm-packed combination grade tomatoes. Furthermore, would it be possible with uniformly packed tomatoes to expand the market outlet either to new buyers within the area or to buyers from outside the area?

#### The Experiment

Arrangements were made during the 1951 season with a few producers to deliver in field crates field-run merchantable tomatoes to the Association warehouse where they would be graded and packed in 10-pound baskets. Due to unseasonably bad weather, one of the driest seasons on record for the area, the crop of tomatoes was not typical. Also some of the producers did not deliver the tomatoes because their crop was almost a failure. Three producers, however, did deliver a total of 3,075 pounds on four different days, August 1, 910 pounds, August 3, 840 pounds, August 6, 660 pounds and August 8, 665 pounds. These tomatoes were carefully graded and packed into 10-pound cardboard baskets.

Each lot of tomatoes was carefully examined in order to determine how best to pack it. For example, Producer No. 1 delivered on August 1, 265 pounds of tomatoes. Close examination showed that about 40 percent were culls, 35 percent U. S. No. 1's and 25 percent U. S. No. 2's. That would pack out nine baskets of U. S. No. 1's, seven baskets of U. S. No. 2's, or 16 baskets of Combination Grade. At prevailing prices the nine baskets of U. S. No. 1's would bring \$9.90, the seven baskets of U. S. No. 2's \$3.50 or a total of \$13.40. The 16 baskets of Combination Grade would bring \$16.00 or \$2.60 more. The crop was packed under the Combination Grade and actually only 15 baskets were obtained with 115 pounds of culls. Culls in this delivery amounted to 43 percent. The final delivery by this producer, because of better grading at picking time, contained but 6 percent culls.

Producer No. 3 delivered the best tomatoes. His first delivery of 350 pounds graded as follows: U. S. No. 1, 68 percent; U. S. No. 2, 23 percent; U. S. No. 1, size B, 3 percent; Culls, 6 percent. At existing prices it was a toss-up whether the producer would receive more by strict grading than by selling the tomatoes packed in the Combination Grade.

Tomatoes delivered the first three times by Producer No. 2 contained so few that would grade U. S. No. 1, it was decided that the extra cost of sorting them out would be greater than selling all as No. 2's. His fourth delivery,

however, improved so much that it was estimated that a combination grade containing slightly more than 60 percent U. S. No. 1 Grade tomatoes could be packed.

Approximately one-third of the total delivered by all producers was packed to meet the Combination Grade, one-third to meet U. S. No. 2 Grade requirements. Only 19 percent were packed as U. S. No. 1 Grade tomatoes. Fourteen percent were culls. When the grader inspected the packs he was asked to estimate the percentage of U. S. No. 1 Grade tomatoes in the Combination Grade. Using his estimate and adding the amount actually packed as U. S. No. 1 Grade, only 1300 pounds or 42 percent of the tomatoes delivered would meet U. S. No. 1 Grade standards.

Long, deep stem cracks and growth cracks on the shoulders were by far the most common cause for the tomatoes being down-graded. Of course the fact that the season was unusually dry and the fields were irrigated may have caused some of the damage. Growers, however, indicated that although the damage was more severe than usual, the loss from stem cracking and growth rings was always heavy and caused considerable loss every year.

It is doubtful whether final conclusions should be drawn from the work during this season. Certainly unless the price spread between U. S. No. 1 Grade tomatoes and the Combination Grade is greater than existed on the Cincinnati Market during the summer of 1951 and a much larger percentage of the tomatoes produced would meet the grade standards of the U. S. No. 1 Grade, producers will receive as high gross returns from the sale of the combination grade as they would if graded into U. S. No. 1 and U. S. No. 2 Grades. Unless a greatly increased percentage of tomatoes meet the grade standards of the U. S. No. 1 Grade either by better or more favorable production conditions, it will be difficult indeed to attract the larger buyers within the area or to expand the sale of locally grown tomatoes into other markets.

#### The Late Crop

Present Method of Marketing the Northern Kentucky Crop. The late crop of tomatoes in Northern Kentucky is now marketed in one of several ways. Beginning about the middle of September, the first and sometimes the second and third packing are marketed in a manner similar to the main crop. That is, picked ripe and packed in 10-pound cardboard baskets. In early October producers change from picking ripe tomatoes to picking them in mature-green stage. This change is made according to producers, to avoid heavy loss due to breakdown at shoulders, stem cracks, and growth rings that often occur later in the season. Also harvesting can be reduced to once or twice a week instead of every other day as is necessary when ripe tomatoes are picked. These late mature-green tomatoes are placed in cellars, sheds or barns fixed up as ripening rooms and allowed to ripen. During most of October the ripened tomatoes are packed in the 10-pound baskets for sale, but later in the season some producers have been packing them in tubes.

The Problem. During recent years producers have found it increasingly difficult to sell these late tomatoes in competition with the shipped-in tomatoes packed in tubes. Local packers bringing in the green-wrapped tomatoes from California, would not handle the locally grown tomatoes because they were not uniform in maturity nor were they sized to meet the requirements of the packing operations.

#### The Experiment for Northern Kentucky Tomatoes

Arrangements were made with a local packer to accept a sizable sample of locally grown tomatoes, ripen them under approved conditions and pack them in tubes for the retail trade. The Cincinnati Produce Growers Association received the tomatoes from the growers, graded and sized them prior to delivering them to the packer. The plans also called for the tomato to be in the pink-ripe or breaking stage of maturity.

#### Problem of Trimble County Tomato Growers

The marketing problems facing Trimble County tomato growers are quite different from those existing in the three Northern Kentucky counties. In Trimble County the first part of the crop is largely sold for canning, although some small proportion goes to the fresh vegetable market. If some of the crop late in the season could be sold for the fresh market it is possible that producers could materially increase returns from the crop. In a normal year production lasts well into October and these tomatoes, if properly handled, might be used in the packing trade. In fact during the past few seasons many truck operators from the south have been buying mature-green tomatoes directly from producers in the area and hauling them south for packaging. This outlet, however, was not dependable, for the truckers would purchase freely one day and might not buy again for a week. If the tomatoes produced in Trimble County were satisfactory for that trade, it appears that they could be used locally for the packaging trade if properly harvested and prepared for the packager.

#### Experiment with Late Tomatoes

Arrangements were made with three producers in Northern Kentucky and three in Trimble County to supply a sample of approximately 100 bushels from each area for experimental purposes. Both samples were delivered to the Association warehouse on Monday, September 22. The samples had been picked on either Friday or Saturday, September 19 or 20. All producers had been carefully shown and instructed on the stage of maturity and size of tomatoes that could be used in the experiment. At least two demonstrations on the farm of each farmer cooperating was held in order to obtain as uniform and satisfactory a sample as possible.

Because of the varying production conditions existing in the two areas the samples from Northern Kentucky and Trimble County were handled separately. The results and conclusions will also be discussed separately.

## Campbell County Tomatoes

Three Campbell County farmers delivered a total of 4,160 pounds of graded tomatoes, (See Table 1). No record was kept of culls, as the producers took them back to the farm, but the amount was relatively small. The tomatoes were graded and sized into three sizes: large, few of which were too large for tubing, the remainder suitable for three tomatoes to the tube; medium size, or those suitable for four tomatoes to the tube; and small, or those suitable to fit with the larger medium size to make four to the tube. A rather large percentage of the small classification were too small for use in packaging, but with the set-up used could not be separated at this stage. There were 800 pounds or 19 percent large tomatoes, 1880 pounds or 45 percent medium-sized tomatoes, and 1480 pounds or 36 percent small tomatoes.

Grading, Sizing, and Ripening. The graded and sized tomatoes were placed in lugs so that it would not be necessary to rehandle them when delivered to the packager. They were delivered to the packager and placed into the ripening room on Tuesday. The temperature was held at 59 degrees F, with humidity at 89 percent for 24 hours. On Wednesday the temperature was increased to 64 degrees F, with humidity remaining the same, and held at that temperature until Saturday evening, or for 72 hours. From Saturday afternoon until Monday morning the temperature was dropped to 60 degrees F, with humidity still at 89 percent. Early Monday morning the temperature was raised back to 64 degrees F and held there for the remainder of the period.

The condition of the tomatoes and the degree of ripeness was carefully checked each day. On Thursday, about 48 hours after the sample had been placed in the ripening room, many of the more mature nearly ripe tomatoes and those that had shown a reddish color when placed in the ripening room, showed black spots on the shoulders. By Friday these spots were quite sizable and were getting deeper. By Monday the tomatoes that showed these black spots also showed a breakdown of tissue within the tomato. The tomatoes picked in the mature-green stage or those picked immature did not show the breakdown to any extent.

Samples of the tomatoes were selected from the ripening room on Friday and taken back to producers on the farm. An examination of tomatoes still unharvested in the fields also showed many in the pink-ripe stage were showing a similar breakdown. Similar breakdown was also found in tomatoes in the ripening rooms on the farm. Samples were selected and sent to the Kentucky Agricultural Experiment Station for analysis and observation.

Packing. It was not until Tuesday, eight days after being placed in the ripening room, that a sufficiently large percentage had ripened to justify handling and packing. On that day 702 pounds were tubed (see Table 1) 660 pounds were replaced in the ripening room and the remainder, 2,798 pounds or 67 percent, were discarded. Only those tomatoes which were in good condition were replaced in the ripening room.

Table I

CAMPBELL COUNTY TOMATOES

LATE CROP - 1952

TOMATOES DELIVERED

Grower No.	Tomatoes Delivered	Size		
		Large	Medium	Small
	Pounds	Pounds	Pounds	Pounds
1	1640	380	760	500
2	1880	340	920	620
3	640	80	200	360
Total	4160	800	1880	1480

TOMATOES PACKED

Grower No.	Packed First Handling	Packed Second Handling	Total Packed	Percent Total
	Pounds	Pounds	Pounds	Pounds
1 and 2*	636	320	956	27
3	66	10	76	12
Total	702	330	1032	25

\*Packed out as one delivery

The causes for discarding tomatoes were: first, breakdown of shoulders causing black spots; second, softening of a part of the tomato; third, stem cracks; fourth, minor injuries such as bruises and scuffed places received either during transporting to market or grading operations; and fifth, worm and disease damage that showed up after grading.

The tomatoes placed back in the ripening room were allowed to stay there until Friday morning when they were again sorted. This second handling resulted in a pack of 330 pounds or exactly 50 percent. The discards from this handling were so immature that it was doubtful whether they would ever ripen, and as the tomatoes had been picked for two weeks some had started to shrivel. There was but little or no breakdown of the tissue noticeable in these green tomatoes.

The total pack-out was 1,032 pounds or 25 percent of the graded and sized tomatoes. This was not a sufficient pack-out to make the project profitable either for the producer or the packer. The fact that the tomatoes were picked too green and required eight days in the ripening room prior to the first handling and 12 days prior to the final handling was undoubtedly the chief cause of the high percentage of loss. Even minor defects on the tomato at the time of harvest had developed into a major defect during the long holding period. However, the tissue breakdown which occurred in the more mature tomatoes within the first few days after being placed in the ripening room was the factor that caused the second greatest loss.

Reports indicated that the tomatoes from Campbell County packed during the experiment were at first well received by the retail trade. However, the reputation was short lived, for those tomatoes that did not move out of the retail trade rather quickly broke down and became watery. The breakdown appeared as a slightly darker place on the skin, then became puffy and watery, indicating a complete breakdown of the tissue. The breakdown was more common in the medium-sized tomatoes rather than in the smaller immature ones or the larger ones. On the last day, 14 cartons or 140 pounds of the tomatoes that had been sent to the retail stores, were recalled and discarded.

#### Conclusions on Campbell County Tomatoes

Before the late crop tomatoes in Northern Kentucky can successfully be marketed through packers it will be essential to find out what is causing the tissue breakdown. As some claim it was the variety produced, it may be necessary to test other varieties until one better adapted is found. Another claim is that the breakdown of tissue was due to a nutritional deficiency. With proper cultural practices it should be possible to correct the nutritional deficiency if that is the cause. Another factor, that may be a contributing factor to the tissue breakdown, was the long ripening period. This can be remedied by harvesting the tomatoes when they are more nearly mature.

In order to meet the requirement of the packager, Northern Kentucky late tomato producers must harvest the crop more nearly ready for packing and sort more uniformly for maturity. In order to obtain a high quality and vine-

ripened flavor, the tomatoes should remain in the ripening room only a short time - from 24 to 48 hours - before being ready to pack. This would reduce cost of operating the ripening rooms. If, as was the case this year, it requires 8 to 11 days to ripen the tomatoes, much if not all of the advantage of their being produced nearby is lost. California tomatoes held in the same ripening room were ready to pack on fourth day and packed out nearly 80 percent in the first run. Locally grown tomatoes must do better than that if they are to be used by local packagers.

### Trimble County Tomatoes

Receipts. The three producers in Trimble County delivered 4,635 pounds of tomatoes. They were graded and sized on Tuesday morning. From the three shipments 3,620 pounds or 78 percent were usable tomatoes and 1,015 or 22 percent were culls (See Table II). Most of the culls could have been eliminated at time of picking had producers graded more carefully. One lot had a very large percentage of worm-damaged tomatoes. Long stem cracks and softness were other causes leading to the high percentage of culls. Although there was some bruise damage caused either by rough handling at picking time or received while being transported to Cincinnati, it was not excessive.

The sample contained 440 pounds or 12 percent large tomatoes, 1,200 pounds or 33 percent medium-size tomatoes, and 1,980 pounds or 55 percent small tomatoes (See Table II). Fully half of the small tomatoes were too small to be usable, but could not be separated at this point. The 3,620 pounds were placed in the ripening room on Tuesday. Temperature and humidity were the same as for the Northern Kentucky sample.

Packout. These tomatoes were much nearer ready for packing than the Northern Kentucky sample and were packed out on Friday after only four days in the ripening room. There was a total of 1,020 pounds packed out on the first handling; 720 pounds were returned for additional ripening and 1,520 pounds were discarded. The main reason for discards was size. Other factors were worm damage that had been missed previously, stem cracks, and the breakdown of the tissue around the stem due to Phoma Rot.

The packer was much concerned because of the development of Phoma Rot. This can infect other tomatoes in the room. In fact some of the California tomatoes stacked next to the sample also showed signs of the rot, although the remainder of the shipment ripened in another room showed no signs of the disease.

The tomatoes that had been placed back into the ripening room showed a considerable amount of damage due to the development of Phoma Rot on them. It was decided on Tuesday to grade out what could be used and discard the remainder, and as a result 225 pounds or 31 percent was packed. That resulted in a total packout of 1,245 pounds or 34 percent of the graded and sized tomatoes, or 27 percent of the total shipment.

Table II

TRIMBLE COUNTY TOMATOES

LATE CROP - 1952

TOMATOES DELIVERED

Grower No.	Tomatoes Delivered	Culls	Percent Culls	Pounds of Graded Tomatoes by size			Total Graded Tomatoes
				Large	Medium	Small	
	Pounds	Pounds					Pounds
4	2795	735	26	220	620	1220	2060
5	1225	105	9	180	440	500	1120
6	615	175	28	40	140	260	440
Total	4635	1015	22	440	1200	1980	3620
Percentage Graded Tomatoes				12%	33%	55%	

TOMATOES PACKED

Grower No.	Packed First Handling	Packed Second Handling	Total Packed	Percentage Graded Tomatoes
	Pounds	Pounds		
4	535	100	635	31
5	345	95	440	39
6	140	30	170	39
Total	1020	225	1245	34

## Conclusions on Trimble County Tomatoes

It will require much more careful grading of tomatoes on the farm before Trimble County tomatoes can be handled satisfactorily by the packager. With greater care in local grading much of the waste at the time the tomatoes were graded would have been avoided. Also, better cultural practices are necessary to control worm damage. The control of Phoma Rot is also necessary before packagers can safely handle the tomatoes from Trimble County.

### General Conclusion

There is a market for a large quantity of tomatoes suitable for tubing during the period when late tomatoes from Northern Kentucky and Trimble County are being marketed. During the past season more than four carloads of California tomatoes were sold in tubes by the local packers on the Cincinnati market during the first week of this experiment. An excess of 11 carloads were handled by them during the two-week period.

If the local growers can produce a tomato that can be handled successfully by the packers, the late tomato crop in Northern Kentucky and in Trimble County could be vastly expanded to meet the local market demands.