



- Vegetable Containers
- Used by Shippers in
- *the Lower Rio Grande Valley*

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## SUMMARY

The use of a large number of different kinds of containers to ship many vegetables is caused partially by the large variety of containers manufactured. The design of vegetable shipping containers is changed from time to time to meet changing shipping conditions, receiver's preferences and to incorporate improvements. However, older styles of containers have not been eliminated, with the result that every change has increased the number of potential containers available.

More than 50 different containers were used to ship vegetables from the Lower Rio Grande Valley of Texas during the three shipping seasons used in the study — 1952-53, 1953-54 and 1954-55. Twenty-one major type containers were used with one to seven different kinds of containers within each major type.

The existence of a large number of containers may lead to indiscriminate uses. Some vegetables require only a minimum amount of protection during shipping and shippers give little attention to the particular type of containers used. Sometimes the stock of regularly used containers is small and shippers must make substitutions. Under these conditions the number of different containers used directly is related to the variety of containers immediately available to the shipper.

The variety of containers and the frequency with which they are used for different vegetables differed among the vegetables shipped from the Lower Rio Grande Valley. During the 3-year period

some vegetables were shipped in only a few types of containers, because of the commodity's sensitivity to handling damage, as with squash and peppers. There is also general agreement throughout the trade as to the "correct" container for some commodities — such as sweet potatoes and dry onions. Vegetables that are not very susceptible to shipping damage and for which the established container convictions in the trade are not rigorously fixed usually are shipped in less than four different containers. A third group of vegetables consisting exclusively of root crops and greens in general, which are least susceptible to shipping damage, and about which there are no established convictions as to the "correct" containers, usually are shipped in many types of containers.

The major effect of the transportation method on the distribution of containers was that a greater variety of containers tended to be used for mixed shipments than for straight shipments.

The use of a large variety of containers creates certain costs for both shippers and receivers through the increased possibility of errors in billing, the requirement of more paperwork and the difficulties in handling and stacking. These costs could be lowered by reducing and standardizing the number of containers used by shippers for each vegetable.

Although this study pertains to Texas, the information obtained on the excess of types of containers used may be applied to other shipping areas in the country.

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# Vegetable Containers Used by Shippers in the Lower Rio Grande Valley

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IN SHIPPING VEGETABLES there has been a tendency to abandon the large, overpacked, nailed crates in favor of smaller nailed crates with less bulge, wirebound crates and fibreboard cartons. However, as new containers have been introduced there has not been a corresponding elimination of older types. Government vegetable inspectors have commented that some containers being used are the same types that were used 30 years ago. The introduction of new types of containers while the old ones still were being retained resulted in increasing the types available in which to ship vegetables.

Policies followed by the fresh vegetable industry with respect to containers have important marketing implications. Many industries follow the concept of "family resemblance" packaging for all products in a company's line. The reasoning behind family packaging is that split-second recognition of a brand by the retailer leads to more sales by the wholesaler; when all packages in a line incorporate the same basic design, the impact registered by the package of one product leads to faster recognition of the other products.

The idea is that a successful package should get the produce to market in the best condition possible, that it should attract attention, identify the product and create such a pleasant effect that the buyer will remember the brand name.

Packaging in the fresh vegetable industry cannot perform these marketing functions adequately if too many types of containers are used.

Policies concerning containers and packaging are important to the shipper and the receiver. Interviews with receivers in the major terminal markets in Texas have indicated that many of them are aware of the importance of containers as a protection to commodities in shipment and in merchandising at the wholesale and retail levels.

## PURPOSES OF THE STUDY

The purposes of this study were to determine the number and variety of containers used for shipping vegetables from the Lower Rio Grande Valley of Texas during the three seasons, 1952-53, 1953-54 and 1954-55 and to determine if there are too many types of containers being used.

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No cost data were to be collected in this study; however, certain deductions on cost implication of different patterns of container use could be made regarding costs caused by the use of too many types of containers and how these costs could be reduced.

## PROCEDURE

Data used in this study were obtained from records of local shippers in the Valley for the three seasons, 1952-53, 1953-54 and 1954-55. These shippers accounted for approximately 80 percent of the total volume shipped. A random sample was drawn of 25 percent of the invoices of each shipper for each season.

## TYPES OF CONTAINERS USED

Containers authorized by the railroad tariff vary greatly in types and sizes. Among the five major classes of containers — nailed wooden crates, wirebound wooden crates, fibreboard boxes, bags and baskets and hampers — are 21 major kinds of named containers, each having one to seven types, Figures 1-4. For example, there are seven different types of lettuce and vegetable crates. These differ only in their dimensions, in some cases only one-eighth of an inch. At least four of these sizes—926, 935, 950 and 957, are used for 30 different vegetables.

More than 50 kinds of authorized containers were used to ship vegetables from the Lower Rio Grande Valley during the period of this study.



Figure 1. Wirebound boxes.

TABLE 1. TYPES OF CONTAINERS USED TO SHIP VEGETABLES FROM THE LOWER RIO GRANDE VALLEY, NUMBER OF VEGETABLES SHIPPED IN EACH TYPE, RANGE OF WEIGHTS SHIPPED IN EACH CONTAINER AND PERCENTAGE OF TOTAL VOLUME, 1952-53, 1953-54 AND 1954-55 SEASONS

| Railroad container code number | Name of container                             | Volume, cubic inches | Number of vegetables shipped |               | Range of weights per pound <sup>1</sup> | Percentage of total volume of weight |
|--------------------------------|---|----------------------|------------------------------|---------------|---|--------------------------------------|
|                                |   |                      | by individual container      | by name class |   |                                      |
| Wooden nailed crates           |   |                      |                              |               |   |                                      |
| 365                            | Cabbage                                       | 3168                 | 2                            |               | 57-58                                   |                                      |
| 368                            | Cabbage                                       | 3223                 | 2                            | 4             | 58-70                                   |                                      |
| 401                            | Cauliflower                                   | 3366                 | 7                            |               | 37-59                                   |                                      |
| 404                            | Cauliflower                                   |                      | 4                            |               | 28-53                                   |                                      |
| 408                            | Cauliflower                                   | 2376                 | 9                            |               | 38-59                                   | 1.04                                 |
| 409                            | Cauliflower                                   | 2447                 | 7                            | 14            | 25-53                                   |                                      |
| 926                            | Lettuce and vegetable                         | 5119                 | 13                           |               | 45-87                                   |                                      |
| 930                            | Lettuce and vegetable                         | 4977                 | 8                            |               | 45-87                                   |                                      |
| 935                            | Lettuce and vegetable                         | 5364                 | 21                           |               | 34-78                                   | 10.99                                |
| 950                            | Lettuce and vegetable                         | 2574                 | 13                           |               | 26-57                                   |                                      |
| 957                            | Lettuce and vegetable                         | 2643                 | 22                           | 32            | 25-57                                   | 2.34                                 |
| 1025                           | Lug box                                       | 1401                 | 2                            | 2             | 36                                      | 6.96                                 |
| 1150                           | Cantaloupe, pony                              | 2677                 | 1                            |               | 58                                      |                                      |
| 1151                           | Cantaloupe, standard                          | 3186                 | 4                            |               |   |                                      |
| 1152                           | Cantaloupe, jumbo                             | 3739                 | 4                            | 4             | 41-78                                   | 7.61                                 |
| 1175                           | Honeydew melon                                | 2390                 | 2                            |               | 41                                      |                                      |
| 1176                           | Honeydew melon                                | 1845                 | 1                            | 2             | 41                                      |                                      |
| 1417                           | Pepper  | 3237                 | 1                            | 1             | 49                                      |                                      |
| 1654                           | Sweet potato                                  | 2412                 | 1                            | 1             | 57                                      |                                      |
| 1700                           | Vegetable                                     | 2112                 | 11                           |               | 21-40                                   |                                      |
| 1705                           | Vegetable                                     | 2127                 | 22                           | 23            | 12-50 <sup>1/2</sup>                    | 1.00                                 |
| Wirebound wooden crates        |   |                      |                              |               |   |                                      |
| 3585                           | Cauliflower                                   | 4510                 | 2                            | 2             | 46                                      |                                      |
| 3730                           | Corn  | 2166                 | 3                            | 3             | 43-58                                   |                                      |
| 3820                           | Lettuce and vegetable                         | 2638                 | 15                           | 15            | 28-60                                   | 20.64                                |
| 4015                           | Tomato  | 2672                 | 3                            | 3             | 63-65                                   | 1.25                                 |
| 4050                           | 1 bushel vegetable                            | 2144                 | 11                           |               | 35-60                                   |                                      |
| 4052 <sup>a</sup>              | 1 1/3 bushel vegetable                        | 2862                 | 4                            | 14            | 31-41                                   |                                      |
| 4126                           | Crate for cello package                       |                      | 7                            | 7             | 14-50                                   |                                      |
| 5004                           | 1 3/5 bushel                                  | 3456                 | 5                            | 5             | 65-70                                   |                                      |
| 5050                           | Watermelon                                    |                      | 1                            | 1             | 79                                      |                                      |
| 5102                           | Cantaloupe, jumbo                             | 3739                 | 18                           | 18            | 11-78                                   | 6.90                                 |
| Fibreboard boxes               |   |                      |                              |               |   |                                      |
| 7002                           | Tomato  |                      | 2                            | 2             | 28-40                                   |                                      |
| 7300                           | Lettuce                                       | 2629                 | 2                            |               | 33-37 <sup>1/2</sup>                    | 1.04                                 |
| 7301                           | Lettuce                                       | 2530                 | 1                            | 2             | 37 <sup>1/2</sup>                       |                                      |
| Bags                           |   |                      |                              |               |   |                                      |
| 7500 <sup>2</sup>              |   |                      |                              |               |   | 29.77                                |
| 7500                           | Woven, waterproof paper fabric bags           |                      | 21                           |               | 40-73                                   |                                      |
| 7525                           | Cotton fabric bags                            |                      | 7                            |               | 25-83                                   |                                      |
| 7550                           | Burlap bags                                   |                      | 6                            | 24            | 25-83                                   |                                      |
| Basket and hampers             |   |                      |                              |               |   |                                      |
| 8026                           | 1 bushel flat-bottom basket                   | 2150                 | 30                           |               | 25-78                                   | 4.09                                 |
| 8028                           | 1/2 bushel flat-bottom basket                 | 1075                 | 2                            |               | 18                                      |                                      |
| 8035                           | 1 bushel round-bottom basket                  | 2150                 | 22                           |               | 20-48                                   |                                      |
| 8050                           | 1 bushel flat-bottom solid or built up bottom | 2150                 | 6                            | 31            | 35-58                                   |                                      |
| 8101                           | Climax basket                                 |                      | 2                            | 2             | 35-58                                   |                                      |
| 8501                           | 1 bushel hamper                               | 2150                 | 11                           | 11            | 25-50                                   |                                      |
| 0001 <sup>3</sup>              | Bulk  |                      | 17                           | 17            |   | .36                                  |

<sup>1</sup>Range of weights in sample.

<sup>2</sup>7500 is a code number used for this study and includes the three types of bags listed.

<sup>3</sup>Code number for bulk shipments used for this study only.



Figure 2. Fibreboard boxes.

Table 1 shows the types of containers used, the number of vegetables shipped in each container, the range of weights per container unit and the percentage of total shipments carried.

The range of weight per container unit usually is large. The extreme case is the jumbo cantaloupe crate (5102), in which 18 vegetables were shipped, with the weight per container unit ranging from 11 pounds to 78 pounds. Lettuce and vegetable crates contained vegetables that varied in weight from 25 to 87 pounds, while the weight of vegetables packed in baskets varied from 18 to 78 pounds.

When examined in terms of the total weight carried, a large percentage of the volume is carried in only a few containers. This is shown in the last column of Table 1. Bags (7500) carried the greatest percentage, almost 30 percent; fol-



Figure 3. Baskets.

lowed by the wirebound, lettuce and vegetable crate (3820) nearly 21 percent and the largest, nailed, wooden, lettuce and vegetable crate (935), almost 11 percent.

Table 2 presents a detailed breakdown of the number of containers used for each commodity as well as the percentage shipped in each container which carried 11 percent or more of total shipment. Twenty different containers were used to ship 21 percent or more of any one vegetable during the 3 years of this study. Three additional containers were used for 11 to 20 percent of the total volume of any one vegetable. However, only one of these carried more than 15 percent. Seventeen percent of greens were shipped in the large, nailed, wooden lettuce and vegetable crates (926). The other containers were used for shipments amounting to less than 10 percent of the total volume of any commodity.

Each container carrying less than 10 percent probably was used for only one or two shipments and was used as an expedient rather than a normal shipping procedure. A shipment had to be made and the regularly used container was not available. Therefore, the most handy type in the warehouse, or a type whose inventory was excessive, was used by the shipper. Such situations probably create the great diversity observed in the use of various types of containers.

The number of different containers used to ship a single vegetable varied from 23 containers in the case of carrots to one in the case of anise, chicory, shallots and garlic, Table 3. However, within this wide range, a relatively large percentage of the total shipments by weight of a majority of the commodities went in a few containers. Eighty-five percent of the total shipments by weight of 25 of the 39 vegetables studied were shipped in one or two containers, five vegetables in three containers and one vegetable in four containers.



Figure 4. Nailed wooden crates.

TABLE 2. MAJOR CONTAINERS FOR EACH VEGETABLE WITH THE PERCENT OF TOTAL AMOUNT OF VEGETABLES SHIPPED IN EACH CONTAINER

| Vegetables        | Number and Percent of Total Containers Shipped |          |                      |          |                     |                   |          |                   |          |                     |                   |          |                   |          | Principal container |          |
|-------------------|--|----------|----------------------|----------|---------------------|-------------------|----------|-------------------|----------|---------------------|-------------------|----------|-------------------|----------|---------------------|----------|
|                   | Less than 1 percent                            |          | 1 to 10 percent      |          |                     | 11 to 20 percent  |          |                   |          | 21 percent or more  |                   |          |                   |          |                     |          |
|                   | Number of containers                           | Per-cent | Number of containers | Per-cent | Cumu-lative percent | Con-tainer number | Per-cent | Con-tainer number | Per-cent | Cumu-lative percent | Con-tainer number | Per-cent | Con-tainer number | Per-cent | Con-tainer number   | Per-cent |
| Radishes          | 9  | 1.8      | 10                   | 37.6     | 39.4                | 409               | 10.0     |                   |          | 49.4                |                   |          |                   |          | 4126                | 50.6     |
| Mustard           | 5  | 1.0      | 2                    | 7.0      | 8.0                 | 5102              | 10.7     | 935               | 13.7     | 32.4                |                   |          |                   | 8035     | 67.6                |          |
| Beets             | 18   | 5.4      | 2                    | 12.0     | 17.4                | 7500              | 19.8     |                   |          | 37.2                |                   |          |                   | 957      | 62.8                |          |
| Turnips           | 11   | 2.5      | 6                    | 22.6     | 25.1                | 935               | 10.6     |                   |          | 35.7                |                   |          |                   | 7500     | 64.3                |          |
| Greens            | 2  | 0.1      | 3                    | 17.4     | 17.5                | 926               | 17.1     |                   |          | 34.6                | 8035              | 23.5     |                   | 935      | 41.9                |          |
| Carrots           | 19   | 0.1      | 1                    | 6.6      | 6.7                 | 935               | 10.1     | 7500              | 15.1     | 31.9                |                   |          |                   | 3820     | 68.1                |          |
| Collard           | 6  | 2.0      | 1                    | 2.6      | 4.6                 | 935               | 10.2     | 8035              | 13.0     | 27.8                | 2                 | 24.9     |                   | 5102     | 47.3                |          |
| Cauliflower       | 6  | 0.9      | 3                    | 7.6      | 8.5                 | 408               | 19.2     |                   |          | 27.7                |                   |          |                   | 3585     | 72.3                |          |
| Onions, green     | 15   | 4.2      | 6                    | 22.5     | 26.7                |                   |          |                   |          | 26.7                |                   |          |                   | 935      | 73.3                |          |
| Lettuce           | 7  | 0.1      | 2                    | 2.2      | 2.3                 | 409               | 10.6     | 7300              | 13.2     | 26.1                |                   |          |                   | 935      | 73.9                |          |
| Broccoli          | 7  | 0.1      | 6                    | 22.4     | 22.5                |                   |          |                   |          | 22.5                |                   |          |                   | 408      | 77.5                |          |
| Endive            | 5  | 1.4      | 2                    | 7.0      | 8.4                 | 957               | 13.4     |                   |          | 21.8                |                   |          |                   | 935      | 78.2                |          |
| Peas, green       |  |          | 1                    | 7.8      | 7.8                 | 8501              | 12.8     |                   |          | 20.6                |                   |          |                   | 8026     | 79.4                |          |
| Turnip greens     | 5  | 1.0      | 5                    | 19.1     | 20.1                |                   |          |                   |          | 20.1                | 8035              | 33.4     |                   | 8501     | 46.5                |          |
| Potatoes          | 3  | 0.1      | 6                    | 16.1     | 16.2                |                   |          |                   |          | 16.2                | 408               | 21.4     |                   | 7500     | 62.4                |          |
| Dill              | 2  | 0.2      |                      |          | 0.2                 | 957               | 14.1     |                   |          | 14.3                |                   |          |                   | 1705     | 85.7                |          |
| Tomatoes          | 6  | 1.1      | 1                    | 1.1      | 2.2                 | 4015              | 14.9     |                   |          | 17.1                |                   |          |                   | 1025     | 82.9                |          |
| Dandelions, green | 2  | 0.9      | 4                    | 12.9     | 13.8                |                   |          |                   |          | 13.8                |                   |          |                   | 1705     | 86.2                |          |
| Peas, field       |  |          | 3                    | 12.8     | 12.8                |                   |          |                   |          | 12.8                | 1                 | 36.5     |                   | 8501     | 50.7                |          |
| Eggplant          |  |          |                      |          |                     | 8035              | 12.8     |                   |          | 12.8                |                   |          |                   | 8026     | 87.2                |          |
| Cabbage           | 18   | 3.4      | 2                    | 6.5      | 9.9                 |                   |          |                   |          | 9.9                 | 5102              | 36.2     |                   | 7500     | 53.9                |          |
| Corn, green       | 13   | 1.8      | 2                    | 7.4      | 9.2                 |                   |          |                   |          | 9.2                 |                   |          |                   | 7500     | 90.8                |          |
| Escarole          | 5  | 3.2      | 2                    | 5.8      | 9.0                 |                   |          |                   |          | 9.0                 | 957               | 20.9     | 8035              | 935      | 42.5                |          |
| Okra              | 2  | 0.4      | 3                    | 7.8      | 8.2                 |                   |          |                   |          | 8.2                 | 8026              | 27.6     |                   | 8028     | 64.2                |          |
| Kohlarbi          |  |          | 2                    | 8.0      | 8.0                 |                   |          |                   |          | 8.0                 | 957               | 24.8     | 4050              | 4015     | 34.9                |          |
| Spinach           | 1  | 0.1      | 3                    | 7.8      | 7.9                 |                   |          |                   |          | 7.9                 |                   |          |                   | 8035     | 92.1                |          |
| Watermelon        |  |          | 1                    | 2.3      | 2.3                 |                   |          |                   |          | 2.3                 |                   |          |                   |          | 97.7                |          |
| Squash            | 3  | 2.0      | 1                    | 4.6      | 6.6                 |                   |          |                   |          | 6.6                 | 3830              | 36.3     |                   | 8026     | 57.1                |          |
| Parsley           | 6  | 0.1      | 3                    | 6.4      | 6.5                 |                   |          |                   |          | 6.5                 |                   |          |                   | 1705     | 93.5                |          |
| Beans             | 1  | 0.5      | 2                    | 5.1      | 5.6                 |                   |          |                   |          | 5.6                 |                   |          |                   | 8501     | 94.4                |          |
| Peppers           | 8  | 0.3      | 1                    | 2.6      | 2.9                 |                   |          |                   |          | 2.9                 |                   |          |                   | 8026     | 97.1                |          |
| Cantaloupe        | 6  | 0.4      | 1                    | 2.2      | 2.6                 |                   |          |                   |          | 2.6                 |                   |          |                   | 1152     | 97.4                |          |
| Onions, dry       | 8  | 0.8      |                      |          | 0.8                 |                   |          |                   |          | 0.8                 |                   |          |                   | 7500     | 99.2                |          |
| Cucumbers         | 2  | 0.4      |                      |          | 0.4                 |                   |          |                   |          | 0.4                 |                   |          |                   | 8026     | 99.6                |          |
| Sweet potatoes    |  |          |                      |          |                     |                   |          |                   |          |                     | 1654              | 26.7     |                   | 8026     | 73.3                |          |
| Anise             |  |          |                      |          |                     |                   |          |                   |          |                     |                   |          |                   | 408      | 100.0               |          |
| Chicory           |  |          |                      |          |                     |                   |          |                   |          |                     |                   |          |                   | 935      | 100.0               |          |
| Garlic            |  |          |                      |          |                     |                   |          |                   |          |                     |                   |          |                   | 7500     | 100.0               |          |
| Shallots          |  |          |                      |          |                     |                   |          |                   |          |                     |                   |          |                   | 935      | 100.0               |          |

TABLE 3. NUMBER OF CONTAINERS USED AND RANGE OF WEIGHTS PER CONTAINER UNIT FOR VEGETABLES SHIPPED FROM THE LOWER RIO GRANDE VALLEY, 1952-53, 1953-54, 1954-55 SEASONS

| Vegetable            | Number of containers used | Range of weights per container unit, pounds |
|----------------------|---------------------------|---|
| Carrots              | 23                        | 10-87                                       |
| Cabbage              | 22                        | 20-75                                       |
| Beets                | 22                        | 12-76                                       |
| Onions, green        | 22                        | 9-65  |
| Radishes             | 21                        | 9-71  |
| Turnips              | 20                        | 10-83                                       |
| Corn, green          | 16                        | 25-75                                       |
| Broccoli             | 14                        | 9-80  |
| Lettuce              | 12                        | 25-78                                       |
| Turnip greens        | 12                        | 11-55                                       |
| Cauliflower          | 11                        | 21-78                                       |
| Collard              | 11                        | 11½-70                                      |
| Potatoes             | 11                        | 20-78                                       |
| Mustard              | 11                        | 9-50  |
| Escarole             | 10                        | 25-45                                       |
| Parsley              | 10                        | 21-55                                       |
| Peppers              | 10                        | 18-73                                       |
| Tomatoes             | 9                         | 36-78                                       |
| Endive               | 9                         | 24-45                                       |
| Onions, dry          | 9                         | 9½-60                                       |
| Greens               | 8                         | 21-58                                       |
| Root parsley         | 8                         | 30-80                                       |
| Okra                 | 7                         | 18-38                                       |
| Dandelions           | 7                         | 21-38                                       |
| Squash               | 6                         | 48-57                                       |
| Kohlrabi             | 6                         | 35-65                                       |
| Peas, Southern field | 5                         | 33-40                                       |
| Spinach              | 5                         | 24-25                                       |
| Beans                | 4                         | 35-50                                       |
| Dill                 | 4                         | 25-29                                       |
| Cucumbers            | 3                         | 50-58                                       |
| Peas, English        | 3                         | 33-48                                       |
| Romaine              | 3                         | 25-56                                       |
| Watermelons          | 1                         | bulk  |
| Eggplant             | 2                         | 36  |
| Sweet potatoes       | 2                         | 57  |
| Anise                | 1                         | 45  |
| Shallots             | 1                         | 53  |
| Cantaloupe           | 8                         |   |
| Chicory              | 1                         |   |
| Garlic               | 1                         |   |
| Honeydew             | 3                         |   |

Less than 85 percent of the total shipments of any one of eight vegetables moved in four or less containers. Indications are that the problem of a large variety of containers is concentrated within this group which includes potatoes, turnip greens, broccoli, green onions, turnips, beets and radishes.

These eight commodities consist exclusively of greens in general and root crops. The greens were shipped primarily in lettuce and vegetable crates (900) and bushel baskets (8026, 8028, 8035, 8050). Turnip greens were shipped once in bags (7500). The root crops were shipped in the greatest variety of types of containers. At one time or another during the 3-year period these were shipped in practically every type of container. This wide variety indicates that little attention was paid to the types of containers used for these

commodities, probably because of the relatively minor danger of damage in shipping.

### CONTAINERS USED BY TYPE OF MOVEMENT

There appears to be a close relationship between the type of transportation as related to the pattern of mixed and straight lot shipments and the use of containers. There was a tendency for a greater number of containers to be used for mixed truck and rail shipments than for straight truck and rail shipments, Table 4. This appears more pronounced when the number of containers used for each media of transportation by seasons is examined. During the 3-year period, 58 different containers were used to ship vegetables and varied from 36 to 44 per year. The greatest variation in numbers of containers occurred in the mixed rail and truck movements. Six to 15 more containers were used for mixed shipments than for straight shipments.

In most instances more different containers were used for a given vegetable when it moved as part of a mixed shipment than when it moved as part of a straight shipment, Table 5. This was probably because an order for a straight car frequently specified the type of container. Orders for mixed car or truck shipments probably did not specify container type, and shippers used whatever types and sizes they had on hand. Three to four times as many containers were used for mixed as for straight shipments for 8 of the 30 vegetables that were shipped both ways. These eight vegetables, mainly root crops and greens, showed the greatest variety of types of containers for all types of movements.

This indicates further that less care was given to the containers for root crops because of the smaller danger of damage. Greens frequently are moved as a part of a mixed shipment, which explains why different kinds of greens tended to be shipped in a great variety of containers. Three or less container types were packed with several different vegetables with the result that commodities which tend to move in mixed lots were shipped in a wider variety of containers than those which tended to move in straight lots.

This is confirmed by the information in Table 6 which indicates the number of vegetables

TABLE 4. NUMBER OF DIFFERENT CONTAINERS USED, BY TYPE OF MOVEMENT AND SEASONS

| Type of movement | Number of containers for 3 years | Shipping seasons |         |         |
|------------------|----------------------------------|------------------|---------|---------|
|                  |                                  | 1952-53          | 1953-54 | 1954-55 |
| Straight rail    | 38                               | 17               | 26      | 25      |
| Mixed rail       | 42                               | 32               | 36      | 34      |
| Straight truck   | 34                               | 10               | 21      | 22      |
| Mixed truck      | 43                               | 26               | 34      | 32      |
| All movements    | 58                               | 36               | 40      | 44      |

shipped in each container for different methods of transportation. The distribution of the number of different vegetables shipped in a given container as part of a mixed lot tended to group around 9 of the more than 44 containers generally used. All but two of the nine (926 and 950) were also major shipping containers for one or more vegetables. These nine containers included all of the major classes. Thus, it appears that a small number of standard containers would be more versatile than the large variety actually used.

With the exception of the differences observed between mixed and straight shipments, the data did not indicate any significant differences between rail and truck in the use of containers. The types of containers which carried the greatest percentage of a given vegetable in truck shipments were the same ones which carried the greatest percentage in rail shipments. Vegetables shipped in a large variety of contain-

ers showed the greatest difference between rail and truck. This probably was due to chance rather than to any special influence of the means of transportation.

### INCREASED COSTS DUE TO NUMBER OF CONTAINERS USED

No cost data were collected in this study and little work has been done on the cost implications of different patterns of container use. However, it is appropriate to consider the extra costs incurred by shippers and receivers because of the pattern of container use during the three seasons.

Use of a large number of different containers, some of which are used sporadically, probably causes some confusion about the net weight of shipments. Such confusion could cause misunderstandings about correct billings and wholesaler discounts on prices until the exact size of the containers and the correct net weight are es-

TABLE 5. NUMBER OF DIFFERENT CONTAINERS USED FOR VARIOUS VEGETABLES BY VARIATION IN SEASONS AND TYPE OF MOVEMENT

| Vegetable            | All types of movement |         |         | Total number of different containers for three seasons | Largest number of containers used for each vegetable by type of movement |          |       |          |
|----------------------|-----------------------|---------|---------|--|--|----------|-------|----------|
|                      | Shipping seasons      |         |         |  | Rail   |          | Truck |          |
|                      | 1952-53               | 1953-54 | 1954-55 |  | Mixed  | Straight | Mixed | Straight |
| Cabbage              | 14                    | 14      | 15      | 22   | 12   | 10       | 12    | 4        |
| Lettuce              | 4                     | 4       | 8       | 12   | 5  | 4        | 7     | 3        |
| Carrots              | 16                    | 12      | 15      | 23   | 14   | 11       | 11    | 7        |
| Beets                | 12                    | 12      | 15      | 22   | 12   | 5        | 11    | 1        |
| Beans                | 3                     | 3       | 3       | 4  | 1  | 0        | 3     | 0        |
| Broccoli             | 9                     | 7       | 10      | 14   | 9  | 2        | 7     | 1        |
| Cauliflower          | 7                     | 5       | 8       | 11   | 6  | 3        | 4     | 2        |
| Cucumbers            | 1                     | 2       | 1       | 3  | 2  | 1        | 1     | 1        |
| Dandelions           | 4                     | 4       | 4       | 7  | 4  | 0        | 2     | 0        |
| Eggplant             | 2                     | 1       | 2       | 2  | 2  | 0        | 2     | 1        |
| Endive               | 7                     | 6       | 4       | 9  | 7  | 1        | 3     | 0        |
| Escarole             | 9                     | 5       | 4       | 10   | 8  | 0        | 3     | 0        |
| Okra                 | 2                     | 4       | 2       | 7  | 0  | 0        | 4     | 2        |
| Onions, dry          | 2                     | 4       | 7       | 9  | 3  | 2        | 5     | 3        |
| Onions, green        | 12                    | 13      | 12      | 22   | 11   | 3        | 9     | 2        |
| Parsley              | 7                     | 6       | 4       | 10   | 7  | 2        | 3     | 1        |
| Peas, Southern field | 1                     | 4       | 5       | 5  | 1  | 0        | 5     | 0        |
| Peas, English        | 1                     | 2       | 1       | 3  | 1  | 0        | 2     | 0        |
| Peppers              | 2                     | 7       | 5       | 10   | 4  | 2        | 6     | 1        |
| Potatoes             | 4                     | 4       | 7       | 11   | 4  | 2        | 4     | 2        |
| Radishes             | 13                    | 14      | 11      | 21   | 12   | 2        | 11    | 3        |
| Spinach              | 2                     | 4       | 3       | 5  | 3  | 1        | 3     | 0        |
| Squash               | 3                     | 4       | 3       | 6  | 3  | 0        | 3     | 1        |
| Turnip greens        | 7                     | 9       | 5       | 12   | 7  | 0        | 6     | 1        |
| Turnips              | 7                     | 13      | 12      | 20   | 12   | 3        | 12    | 2        |
| Cantaloupe           | 2                     | 6       | 3       | 8  | 2  | 2        | 4     | 3        |
| Collard              | 4                     | 6       | 9       | 11   | 5  | 1        | 9     | 0        |
| Corn, green          | 12                    | 4       | 10      | 16   | 7  | 3        | 6     | 4        |
| Dill                 | 3                     | 1       | 2       | 4  | 2  | 0        | 1     | 0        |
| Greens               | 7                     | 1       | 1       | 8  | 7  | 1        | 4     | 0        |
| Kohlrabi             | 1                     | 4       | 0       | 6  | 3  | 1        | 1     | 1        |
| Mustard              | 6                     | 5       | 9       | 11   | 4  | 1        | 9     | 0        |
| Root parsley         | 6                     | 4       | 4       | 8  | 6  | 1        | 3     | 0        |
| Sweet potatoes       | 0                     | 1       | 1       | 2  | 0  | 0        | 1     | 0        |
| Tomatoes             | 6                     | 6       | 6       | 9  | 3  | 4        | 5     | 5        |
| Watermelons          | 0                     | 1       | 1       | 1  | 0  | 0        | 1     | 1        |
| Anise                | 1                     | 0       | 0       | 1  | 1  | 0        | 0     | 0        |
| Chicory              | 1                     | 0       | 0       | 1  | 1  | 0        | 0     | 0        |
| Romaine              | 3                     | 0       | 0       | 3  | 1  | 0        | 2     | 0        |
| Garlic               | 0                     | 0       | 1       | 1  | 0  | 0        | 1     | 0        |
| Honeydew             | 0                     | 0       | 3       | 3  | 3  | 1        | 1     | 2        |
| Shallots             | 0                     | 1       | 0       | 1  | 1  | 0        | 0     | 0        |



published. The tendency for price discounts to exist possibly is related to the uncertainty caused by the variability in package size and weight. The only way shippers can avoid these problems is by weighing the individual shipments. Costs were incurred which could have been avoided if greater standardization had been made of containers and established unit weights for all containers in which a given vegetable would be shipped. Lack of uniformity in the unit of shipment and unit of billing makes record keeping by members of the industry more difficult and, therefore, more costly. This increase in record keeping costs affects both shippers and receivers. In addition, the accuracy of market information is decreased because of the variation of the possible shipping units used in reporting.

Costs of loading and handling fresh vegetables—especially mixed cars—probably are increased because of the more complicated operations caused by the variety of sizes and types of containers which are used. Odd sizes and shapes make containers more difficult to stack in cars, trucks and storage areas and require more labor time. Odd-sized containers increase wasted space in loading cars and trucks and decrease the efficiency of the transportation services.

### CONCLUSIONS

Vegetables that require careful handling during shipments can be packed in fewer types of containers than the industry currently is using without materially affecting marketing practices nor reducing protection from shipping damages.

TABLE 6. NUMBER OF VEGETABLES SHIPPED BY CONTAINER BY SEASON AND BY TYPE OF MOVEMENT

| Container code number | All types of movement            |         |         | Total number of different vegetables for three seasons | Largest number of vegetables shipped in the containers by type of movement |          |       |          |  |
|-----------------------|----------------------------------|---------|---------|--|--|----------|-------|----------|--|
|                       | Shipping seasons                 |         |         |  | Rail   |          | Truck |          |  |
|                       | 1952-53                          | 1953-54 | 1954-55 |  | Mixed  | Straight | Mixed | Straight |  |
|                       | ----- Number of Vegetables ----- |         |         |  |  |          |       |          |  |
| 1                     | 7                                | 13      | 5       | 17   | 3  | 3        | 9     | 8        |  |
| 365                   | 1                                | 2       | 0       | 2  | 1  | 1        | 1     | 1        |  |
| 368                   | 1                                | 1       | 0       | 3  | 1  | 1        | 1     | 0        |  |
| 401                   | 5                                | 1       | 4       | 7  | 5  | 1        | 1     | 0        |  |
| 404                   | 2                                | 0       | 2       | 4  | 2  | 0        | 0     | 0        |  |
| 408                   | 6                                | 4       | 6       | 9  | 6  | 3        | 4     | 1        |  |
| 409                   | 4                                | 4       | 4       | 7  | 3  | 2        | 4     | 1        |  |
| 926 <sup>1</sup>      | 13                               | 1       | 1       | 13   | 11   | 4        | 9     | 1        |  |
| 930                   | 2                                | 0       | 1       | 8  | 6  | 0        | 1     | 0        |  |
| 935 <sup>1</sup>      | 17                               | 17      | 16      | 21   | 14   | 6        | 16    | 4        |  |
| 953 <sup>1</sup>      | 12                               | 1       | 2       | 13   | 10   | 1        | 5     | 0        |  |
| 957 <sup>1</sup>      | 13                               | 19      | 16      | 22   | 16   | 4        | 3     | 1        |  |
| 1025                  | 2                                | 1       | 1       | 2  | 1  | 1        | 1     | 1        |  |
| 1150                  | 0                                | 1       | 1       | 1  | 0  | 1        | 1     | 1        |  |
| 1152                  | 1                                | 2       | 4       | 4  | 2  | 1        | 2     | 2        |  |
| 1175                  | 0                                | 0       | 2       | 2  | 1  | 1        | 2     | 1        |  |
| 1176                  | 0                                | 0       | 1       | 1  | 1  | 0        | 0     | 0        |  |
| 1417                  | 1                                | 0       | 0       | 1  | 1  | 0        | 0     | 0        |  |
| 1654                  | 0                                | 1       | 0       | 1  | 0  | 0        | 1     | 0        |  |
| 1700                  | 9                                | 4       | 1       | 11   | 9  | 0        | 3     | 0        |  |
| 1705 <sup>1</sup>     | 13                               | 12      | 10      | 22   | 11   | 1        | 9     | 1        |  |
| 1985                  | 1                                | 2       | 1       | 2  | 2  | 1        | 1     | 1        |  |
| 2730                  | 1                                | 3       | 1       | 3  | 3  | 1        | 0     | 1        |  |
| 3820 <sup>1</sup>     | 5                                | 10      | 12      | 15   | 9  | 5        | 10    | 1        |  |
| 4015                  | 2                                | 2       | 1       | 3  | 2  | 2        | 1     | 1        |  |
| 4050                  | 8                                | 3       | 6       | 11   | 7  | 5        | 2     | 1        |  |
| 4052                  | 0                                | 0       | 4       | 4  | 1  | 0        | 3     | 0        |  |
| 4126                  | 3                                | 5       | 5       | 7  | 5  | 1        | 5     | 1        |  |
| 5004                  | 0                                | 4       | 2       | 5  | 2  | 1        | 2     | 0        |  |
| 5050                  | 0                                | 0       | 1       | 1  | 0  | 0        | 1     | 0        |  |
| 5102 <sup>1</sup>     | 3                                | 4       | 14      | 18   | 11   | 3        | 6     | 2        |  |
| 7002                  | 1                                | 1       | 1       | 2  | 0  | 1        | 1     | 1        |  |
| 7300                  | 0                                | 1       | 2       | 2  | 2  | 1        | 1     | 1        |  |
| 7301                  | 0                                | 0       | 1       | 1  | 0  | 1        | 1     | 0        |  |
| 7500 <sup>1</sup>     | 8                                | 14      | 19      | 21   | 11   | 7        | 17    | 8        |  |
| 7525                  | 1                                | 1       | 7       | 7  | 4  | 3        | 7     | 1        |  |
| 7550                  | 1                                | 6       | 2       | 6  | 3  | 4        | 2     | 2        |  |
| 8026 <sup>1</sup>     | 19                               | 22      | 19      | 30   | 15   | 4        | 20    | 6        |  |
| 8028                  | 0                                | 2       | 1       | 2  | 1  | 0        | 2     | 1        |  |
| 8035 <sup>1</sup>     | 18                               | 11      | 17      | 22   | 14   | 3        | 15    | 1        |  |
| 8050                  | 2                                | 2       | 2       | 6  | 1  | 0        | 2     | 1        |  |
| 8101                  | 2                                | 1       | 1       | 2  | 2  | 0        | 1     | 0        |  |
| 8501                  | 5                                | 5       | 6       | 11   | 5  | 1        | 6     | 2        |  |
| 9000                  | 0                                | 0       | 1       | 1  | 0  | 1        | 0     | 0        |  |

<sup>1</sup>Major container for one or more vegetables.

If fewer types of containers were available, shippers would tend to eliminate the containers that present shipping problems. The use of odd containers to reduce inventories or as a measure of expediency would decrease.

This would result in reduced costs, improved packer-receiver billing and discount relations and greater accuracy of market reports.

This 3-year study of shippers' practices regarding types of containers used in the Lower Rio Grande Valley of Texas indicates that further research is needed to determine the minimum requirements for protection of vegetables during shipments, the most desirable size of containers necessary for efficient marketing of each vegetable and the optimum number of containers necessary for the industry.

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