

# **NAPOLEON DIDN'T CONQUER EUROPE BY FEEDING HIS ARMY ROTTEN TOMATOES OR HOW TO GET THE MOST FROM YOUR PRODUCE INVESTMENT**

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## **ABSTRACT**

Proper handling and storage of produce items can increase shelf life thus positively impacting budget. At the Saint Louis Zoo we have tried various approaches to storage and have a system that works well for us. From which items to hold in the Kitchen area and to which produce items to hold in the cooler and the storage method that extends product integrity, we will cover what works for us to allow produce to be its best.

## **Safe Refrigerator Temperature**

For safety, it is important to verify the temperature of the refrigerator. According to the ServSafe Essentials course guide it is a good idea to keep the cooler temperature at least two degrees cooler than the desired food temperature.

Temperature should be checked and recorded daily. We check ours randomly throughout the course of the day to make sure we are at a comfortable holding temperature. Be sure doors are closed tightly at all times. Don't open doors more often than necessary and close them as soon as possible.

## **Produce Quick Check List**

Inspect produce when it is received. By identifying quality here you can send out ripe and ready produce first and hold items that could benefit by holding a few more days to reach their potential. Remove any produce that does not appear fresh, a quality control measure to assure that decaying items do not harm box buddies.

Remove ice from greens that are covered with it. Some packers use ice as an insulator to protect product.

Mark boxes with the date of receipt.

Make sure that all stock is rotated so that the oldest stock will be used first. This helps to ensure that storage lengths are kept to a minimum.

Keep gaps between all produce boxes and wall of the cooler. This increases the surface area exposed to the cool air and helps maintain an acceptable temperature.

Our cooler has blowers in the front and back of the room and the air exchanges an average of 40 times per hour. For this reason we cover all items that are prone to dehydration, mainly greens and vegetables. By isolating those items and covering them with moving blankets we have seen a holding time in excess of a week for some items while maintaining texture and freshness.

If possible product should be stored in its original packaging.

We have a sheet of substitutions available to allow for appropriate substitutions related to availability.

We

separate produce into basic groups:

Greens	– Lettuces, collards, turnip greens, kale...
Fruit	– Apples, pears, oranges, tomato...
Vegetable	– Green Pepper, green beans, cucumber, squash...
Starch	– all potatoes, turnips, rutabaga, corn...

By doing this we can substitute like items taking into consideration price and availability. For example, when costs of a particular item spike due to certain circumstances we can replace it with another item in the same category. By doing this we have been able to track under budget while increasing the variety offered to the collection.

## Holding

We utilize two different holding areas for the produce we receive; the cooler for the bulk of our holding, and two stainless steel tables along one of our kitchen walls. Our cooler holds at 38 degrees with a relative humidity of 65 percent. Our kitchen temperature usually holds between 68 and 72 degrees during the summer and 65 and 68 degrees during the winter.

As a general rule greens are placed on pallets and covered with moving blankets. When possible vegetables are also placed on pallets and covered. If pallet space is unavailable we put the vegetable boxes or crates into large trash bags and place them onto rolling carts.

The following list illustrates the areas where we keep certain items.

## Fruits

### Kitchen

**Avocado** - We hold ours in the kitchen until ripe, then refrigerate.

**Bananas** - We remove the plastic wrap they arrive in and hold them in our kitchen in the original boxes.

**Plums** - We hold ours in the kitchen until ripe, then refrigerate.

**Peaches** - We hold ours in the kitchen until ripe, then refrigerate.

**Nectarines** - We hold ours in the kitchen until ripe, then refrigerate.

### Cooler

**Apples** - We keep ours in the original boxes in the cooler and have been able to consistently hold them beyond two weeks if necessary

**Berries** - Discard any bruised berries and refrigerate. Use berries as soon as possible.

**Citrus** - We keep ours in the original boxes in the cooler and have been able to consistently hold them beyond two weeks if necessary

**Cranberries** - Refrigerate (2-3 weeks) or freeze in original package (8-12 months).

**Grapes**- Refrigerate in shipped boxes and leave in bags.

**Kiwi** - We place ours in the cooler in the original boxes

**Melons** – We place ours in the cooler in the original boxes.

**Pears** - We place ours in the cooler in the original boxes.

**Pineapple** - We place ours in the cooler in the original boxes.

## Vegetables

## **Kitchen**

**Onions** - We keep ours in the kitchen area in a rolling tub.

**Potatoes, Sweet** - We keep ours in the kitchen area in the boxes they arrive in.

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## **Cooler**

**Beans** – Upon arrival we store them in the cooler under moving blankets or place crate in a large trash bag to protect.

**Beets** - Refrigerate in plastic bag.

**Broccoli** - This is an item hold in our cooler and cover to keep from drying out.

**Cabbage** - This is an item hold in our cooler and cover to keep from drying out.

**Carrots** - We hold ours in the cooler in the original plastic bag.

**Cauliflower**- We hold ours in the cooler in the original packaging.

**Celery** - This is an item hold in our cooler and cover to keep from drying out.

**Corn** - This is an item hold in our cooler and cover to keep from drying out.

**Lettuce** - This is an item hold in our cooler and cover to keep from drying out.

**Peppers** - This is an item hold in our cooler and cover to keep from drying out.

**Spinach** - This is an item hold in our cooler and cover to keep from drying out.

**Squash, Summer**- We keep ours in the cooler.

**Squash, Winter** - We keep ours in the cooler.

**Tomatoes** - We hold ours in the kitchen until ripe. When they are ripe we move them into the cooler.

**Turnips** - We hold ours in the cooler in the original plastic bag.

## **Packing for delivery**

The Saint Louis Zoo delivers in bulk to the habitats on a daily basis or in some cases every other day depending on the holding capability of the areas.

The moniker “If you would not eat it, do not feed it” should be used. Always look for crisp, not limp, greens and vegetables and watch for bruising and discoloration.

Limit exposure time to room temperature of delicate vegetables and greens to the greatest extent possible. When possible, pack them in the cooler.

Tomatoes and bananas are packaged and kept in the kitchen.

Hearty produce can be packed up to 3 days in advance.

Delicate vegetables and greens should be kept separate from other produce after packing.

We typically place greens in a separate box. If the amount to pack is small and can fit into the container with everything else we place the greens into a plastic bag.

Produce requires a broad spectrum of preferable holding temperatures to be perfect, and many of us, if not all of us, cannot accommodate the various zones needed. By maximizing the zones we have, and by utilizing the system that works for each of us, we can expand the variety offered and the highest quality possible. As Napoleon said an army runs on its stomach. But remember, so does a Zoo.