

POSTHARVEST DISEASES AND STORAGE CONDITIONS IN BUTTERNUT SQUASH (*Cucurbita moschata* Duch.) IN ARGENTINA

I. Vigliola

Cátedra de Horticultura, Facultad de Agronomía, Universidad de Buenos Aires, Av. San Martín 4453, (1417), Buenos Aires, Argentina

First of all I would like to tell you that when I was still in Argentina Dr. Pál Sass told me that I could have a lecture at this Symposium. As if I usually do when I give a lecture, I will begin with some of my thoughts.

"We must not forget that first of all we research in postharvest, to preserve foods and it is necessary, if we wish to conclude our research, that those foods must reach the people".

Argentina is about two and a half million kms square.

We have about five hundred thousand hectares under vegetables and generally speaking we provide vegetables for the entire country, thirty five million people, and to a lesser extent for export.

Butternut squash represents 90 % of the total of squashes traded in the Central Market of Buenos Aires (MCBA); thirty thousand ha of this crop are sown annually (0.015 % of the total surface of the country), with a production figure of 450.000 t.

The crop is grown in many areas of the country under varying conditions. Food marketed at Buenos Aires wholesale level is distributed throughout an urban area of twelve million inhabitants. Butternut squash has proved popular among consumers because of its flavour and culinary properties. Consumption of butternut squash for the last ten years has been high.

To supply market requirements during the whole year, squash is stored for as long as seven to eight months, with consequent disease problems.

Squash is stored during the fall and winter seasons (March to September) in dry areas of Cuyo region, in piles in the field, or in sheds without humidity or temperature control. In high humidity areas of the Pampas region it is stored in sheds for three to four months. Only a small quantity of the crop is stored under controlled conditions. As you may know for butternut squash control conditions are 7-10 °C; 70 % R.H.

Wet soil will predispose squash to infection. Healthy squash at harvest time, dry soil, early harvested fruit with complete expansion, are pre-harvest factors that must be considered in areas with a high percentage humidity.

When losses at wholesale level are considered, susceptibility to fungal decay is clearly the main problem.

At MCBA in several years, as you see for 1988 in Table 1, we identified different *Fusarium* species as *F. culmorum*, *F. solani*, *F. equiseti*, *F. moniliforme* and *F. graminearum*. Species of *Fusarium* and *Rhizopus stolonifer*, were the most commonly isolated pathogens.

Table 1. Nature and extent of losses in squash at wholesale level (1988).

<i>Causes of loss</i>	<i>Bags (20 kg)</i>			
	Total	%	Losses	%
<u>Parasite</u>				
Fusarium rot	2803	35.92	1387	42.90
Rhizopus rot	2894	37.09	862	25.60
Alternaria rot	1017	13.03	625	19.90
Erwinia rot	237	3.03	110	3.40
Phoma rot	308	3.94	85	2.62
Colletotrichum rot	214	2.74	20	0.61
Sclerotinia rot	17	0.21	17	0.52
<u>Physiological disorders</u>				
Dehydration	170	2.17	50	1.54
<u>Physical injuries</u>				
Chilling	142	1.81	65	2.00
Total	7802	100.00	3241	100.00

Fusarium culmorum infection was found associated with saprophytic bacteria which almost certainly contribute to the rotting of the fruit.

During the storage period, most decay problems were observed in July and August. In the latter month squash supplies coming from storage decrease drastically and fruits from the new crops begin to appear.

Butternut squash should not be stored because of its thin epidermis. In spite of this, Argentine producers store it to secure supplies of the product throughout the year (Table 2). Storage methods are very simple in dry areas as the product is left in the field, in piles covered with straw, and isolated from the ground. Another more complicated way of storage is under sheds, without temperature or humidity control, with lateral protection from sun and rain provided by some natural material.

Table 2. Area of production, storage period, bulk number and losses (1988).

<i>Area of production</i>	<i>Storage period</i>	<i>Bulk</i>			
		By area	%	By losses	%
Mendoza	Feb. -Nov.	3009	38.5	1395	43.0
Buenos Aires (south)	May-June	1724	22.0	607	18.7
Santiago del Estero	June-Feb.	1246	15.9	437	13.5
Río Negro	June-July	456	5.8	221	6.8
Buenos Aires (around City)	Dec.-Aug.	566	7.25	310	9.6
Buenos Aires (coastal)	March-July	15	0.2	15	0.45
Salta	Oct.-Nov.	150	2.0	32	0.98
La Rioja	March-Aug.	402	5.1	116	3.5
Santa Fe	June-Jan.	127	1.6	59	1.8
Córdoba	June	107	1.3	49	1.5
Total		7802	100.00	3241	100.00

A third more sophisticated way (for small quantities) has temperature control systems. These methods provide for long storage periods.

The longer the storage period, the higher is the susceptibility to infection. The more sophisticated the storage method, the lower is the susceptibility to infection.

In case of *Rhizopus*, a natural inhabitant of the soil, infection focus appears at one point and moves to another and spreads the disease from one fruit to others. The same happens with *Fusarium* species. Meanwhile *Colletotrichum* infection begins in the field as a small point and extends to a big area of decay after some months of storage. These losses (31 % in piles and 18 % under sheds) are enhanced by extended storage, high temperatures, low relative humidity, physical damage and chilling injury.