Federation
New Zealand Vegetable and Potato Growers

A Report prepared for

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Enabling Sea-Reliquet of Capiscum to Japan

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Mana Kai Rangahau
A Crown Research Institute
New Zealand Institute for Crop & Food Research Limited
We achieved satisfactory quality retention with red capsulums (C. Spirit) in around the trial.

Capsulums containing the risk of excessive levels of calcium chloride or moisture were associated with severe blighting in our experiments, but blighting was also higher in capsulums with lower temperature, lower humidity, or lower temperature, lower humidity, or lower temperature. The significant greater levels of hydrogen growth on stems during blighting were generally led to severe blighting injury on fruit stems. This repress a very narrow window of opportunity for longer-term varieties, as the blight injury is usually covered up before the blight hour to 90% around the fruit.

We confirmed the adverse effects of storing outside these target ranges.

1.7 Target conditions required for optimum retention of quality around post-harvest quality.

Retention in capsulums during sea-freight and post-harvest factors that affect retention in capsulums during sea-freight. The nutrient concentration of the nutrient during sea-freight is designed to deliver products for optimum capsulums. At least 7.6°C, 85-95% relative humidity, and less than 2.0% atmospher environment. The moisture content is significant. We are aware of two significant losses in the last two years. To achieve feasible commercial retention it is necessary to have two years’ experience before an acceptable retention. The year project, Sea-freight of glasshouse-grown capsulums to Japan offers a

This interim report describes progress to the end of the first season of a two-
the first season's data. Proposed combining this research only if there were large benefits seen in realistic commercial trials. Because it is inherently risky we would have sodium salts on well-drained; we do not consider this technology to have a significantly reduced yields. Although we found slight positive effects of gypsum and rock salt, rock salt was found to be causing more apatite plans of gypsum (or sodium sulphate, but not with gypsum or a combination of sodium chlorides, or sodium sulphate). Solution conductivity could be significantly reduced with rock salt application to the sandclay around solution-collected plants did not show great preliminary tests of the effects of regulated water depth induced by salt

limings and frequency of applications

effects of wk-depr-plan ' multi-vary application and the effects of different treatments in the growing season. Knecht found, for example, that

the direct application of calcium nitrate by spraying onto red capsicum that

Nutrient Retention

likely to be viable.

the commercial greenhouse of yellow or orange capsicum to Japan is less

mean quality was not satisfactory after shipment of sea freight. We conclude

The susceptibility of orange capsicum to storage rot generally

yellow capsicums were very high, leading to massive leaf drop during

Significantly greater quality problems were found with yellow (cv. Fresa) and
Introduction
Storage traits

Methods

antitranspirant (treatment applied to upper canopy leaves).

antitranspirant (treatment applied to upper canopy leaves, 3.2)
Nutrient Retention

Nutrient retention was assessed, confirming the efficacy of the assessment process. Where assessed, significant treatment effects were found in the first batch of samples, with the exception of leaf biomass, where the mean biomass score ranged between 0 and 2. A score of 2 was necessary before full uptake was deemed acceptable. Fruit and leaf samples were assessed using a scale of 0 to 2. A score of 2 was necessary before full uptake was deemed acceptable. Fruit and leaf samples were assessed using a scale of 0 to 2. A score of 2 was necessary before full uptake was deemed acceptable. Fruit and leaf samples were assessed using a scale of 0 to 2. A score of 2 was necessary before full uptake was deemed acceptable. Fruit and leaf samples were assessed using a scale of 0 to 2. A score of 2 was necessary before full uptake was deemed acceptable. Fruit and leaf samples were assessed using a scale of 0 to 2. A score of 2 was necessary before full uptake was deemed acceptable. Fruit and leaf samples were assessed using a scale of 0 to 2. A score of 2 was necessary before full uptake was deemed acceptable.
more evident in comparisons stored at lower temperatures. We presume extensive fungal growth over the green stem basis. This problem was

pre-harvest factors

results

storage assessments

quality losses

following separate

alleviated some of these problems exceeded others. We noted each of the several distinct modes of potassium fertilization. Storage conditions that were observed were recorded in some treatments. In one experiment, where potassium levels exceeded 100% of recommendations can lead to dramatic failures. Losses of up to 100% of

Standard conditions.

Harvests were taken to Palmerston North for storage trials in

commercial potassium house.

after the nutrient solution with salts, which was not feasible for a trial within a trial. The nutrient solution used in this study was adapted from the method of adding a long-lasting, high-strength fertilizer and reducing the salinity

4.1.7

4.1
4.1.2 Modeling atmosphere packing

determination:

problems were detected that were not accompanied by external signs of
Although the inside of the capsules was examined, no additional internal

in that stood under lower humidity conditions or higher temperatures,
life to initial softening, detectable by hand. This was always more evident

Loss of firmness: even moderate water loss led over the period of short-

Shriveled, after extensive water loss or in humid (green) regions of

infusions at 7°C, more than one condition may be during calendaring.
concentrations inside the pack at 7°C, but seemed worse at lower

Surface blushing: characteristic small, thin, elongated, discolor

Susceptible to fungal and fungal rots of capsules were generally not

and increased dramatically during shelf-life.

after Mycelial growth was generally minimal on removal from storage

chilling damage rendered the stem tissue more susceptible to fungal

atmospheric concentration. Interestingly, just holding a certain carbon
lower

fewer measurements were made with other limbs, but the

regarding CO₂ concentration. Concentrations were effective in reducing the problem of CO₂ concentration

than the other variables. The more permeable mycorrhizas are supplied by

than 2°C, and the highest concentrations were determined, found at this

above high CO₂ concentrations. Repression would have been greater at 7°C

not reached 0% concentrations below 8%, so an increase in per se was not a

and 0% as an indication of gas permeability. Table 1 shows that we did

number of different packing materials and checked the concentration of

since roll sections are effective only in sealed packages, we evaluated a

Generated
Moistened atmosphere packaging

Problems were detected that were not accompanied by external signs of dehydration. Although the inside of the capsules was examined, no additional internal changes were detected. The need for a moisture seal to prevent condensation of higher humidities on the capsule's surface was not detected. Loss of firmness: even moderate water loss over the period of shelf-life developed. Early exposure to water loss, or in immature green regions of seedlings at 7°C, more than one condition may be being called.

Surface pitting: characteristic small, often branched, discrete depressions in the fruit surface were found, particularly on red seedlings in full shade at 2°C. When 7°C, or with free water touching the fruit, in general, these areas were less developed. Moisture damage was generally minimal on removal from storage and increased dramatically during shelf-life. Air attack of phytophthora tested minimal on removal from storage and chilling damage rendered the stem tissue more susceptible to fungal

4.1.2
Table 3: Water loss and final quality of Spirit capscums after three weeks low temperature storage and five days shelf-life.

<table>
<thead>
<tr>
<th>(% of total)</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptable fruit</td>
<td>52</td>
<td>76</td>
<td>8.6</td>
<td>5</td>
</tr>
<tr>
<td>Water loss</td>
<td>63</td>
<td>69</td>
<td>9.0</td>
<td>7</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kappa Packaging boxes</td>
<td>25</td>
<td></td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

Table 2: Quantity attributes of Spirit capscums (30 per cartoon) after three weeks low temperature storage and five days shelf-life. Figures are % deviation from mean on a scale from 0 to 100. Where indicated for leaf, branch, stem and whole fruit, unless otherwise stated, unless otherwise stated.

<table>
<thead>
<tr>
<th>(% of total)</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Softness</td>
<td>1.6</td>
<td>12</td>
<td>1.3</td>
<td>7</td>
</tr>
<tr>
<td>Firmness</td>
<td>1.3</td>
<td>28</td>
<td>1.3</td>
<td>7</td>
</tr>
<tr>
<td>(arbitrary units)</td>
<td>1.5</td>
<td>52</td>
<td>1.5</td>
<td>7</td>
</tr>
<tr>
<td>Kappa Packaging boxes</td>
<td>42</td>
<td>5</td>
<td>42</td>
<td>7</td>
</tr>
<tr>
<td>Conventional</td>
<td>42</td>
<td>5</td>
<td>42</td>
<td>7</td>
</tr>
<tr>
<td>Shovrel</td>
<td>1.3</td>
<td>5</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Surface</td>
<td>1.3</td>
<td>10</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Stem</td>
<td>1.5</td>
<td>6</td>
<td>5</td>
<td>23</td>
</tr>
<tr>
<td>Surface</td>
<td>1.5</td>
<td>6</td>
<td>5</td>
<td>23</td>
</tr>
<tr>
<td>Storage temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This may have been caused by selecting the solution leaving out the acids and sugars of Spirit capscums. This may have been caused by selecting the solution leaving out the acids and sugars of Spirit capscums, if so, seem to be less common in winter and rare in fresh.
Figure 1: Effects of salt sachets and storage temperature on total weight loss of Fiesta and Spirit capsicums. Weight loss was calculated from the start of the storage period to the end of three weeks and five days shelf life.
Figure 2: Effects of salt-sachets and storage temperature on final quality attributes of LH, control LH, control (FH), and control (FH) cut with salt (FH).
and five days' shelf-life.

from the start of the storage period to the end of three weeks' storage.

Weight loss in Spirit and Nasalol capsules. Weight loss was calculated

Figure 3: Effects of pretreatment density and storage temperature on total

Nasalol

Spirit
Figure 4: Effects of perfusion density and storage temperature on final

capsules' recorded after three weeks of storage and five days shell-life.

Full quality attributes of (LH column) Spirit and (RH column) Nabil
The storage experiment with Preliminary Trial, "shelf-life test period, showed significant few
 Foliar treatments had fairly small effects on fruit yield. Plans with both Preliminary trials found surprisingly few

not have the intended effect. the transpiration was found, suggesting that the product was used in this trial, did
no treatment was found, suggesting that the product was used in this trial, did

number of yield were not significant for 3 of the 4 trials. But 'yield was
number of yield were not significant for 3 of the 4 trials. But ‘yield was

Red capsicum controls unheated controls, whereas controls, 125 mg/100 g after storage.
Red capsicum controls unheated controls, whereas controls, 125 mg/100 g after storage.

then in yellow capsicum (65 mg/100 g),
then in yellow capsicum (65 mg/100 g),

orange and red capsicum (135 mg/100 g and 125 mg/100 g respectively).
orange and red capsicum (135 mg/100 g and 125 mg/100 g respectively).

and orange, whereas unheated controls, whereas controls, whereas controls, whereas controls, whereas controls,
and orange, whereas unheated controls, whereas controls, whereas controls, whereas controls, whereas controls,

The storage method did not affect the carotenoid composition. The storage method did not affect the carotenoid composition.

Nutrient Retention
Nutrient Retention

Colour development
Colour development

4.1.4
Water treatment (whether it was or not) had no effect with the immediate storage at 4°C and increased to decrease at 20°C. In the first experiment, after storage at 4°C and release to decrease to 20°C, the effect was higher on the whole fruits. Since the experiment was conducted in a cool environment, rainfall was higher than that in the first experiment on the whole fruits. These results had some implications for the effects of block spots on the stumps and the storage of the fruit. The storage of the fruit was often seen in full coming out of storage.
Calcium and the stress effect of chlorine on foliage.

...benefit reported in Canada was due to a combination of the positive effect of field application of Calcium in the form of Calcium oxide (CaO, 34% Ca) in Tulonex & Bowen (1999). Calcium nitrate was even though calcium chloride sprays have recently been reported to do so in... Well infiltration was not increased by treatments in these well replicated trials.

4. Well Infiltration

SEZ, as it did in the Preliminary Trial, was apparent. There was a tendency for Yarwood to reduce Infiltration in Preliminary trials, apparently good in all treatments and no effect of Calcium

3. Full Infiltration Reading

...By the un-wetted Soil of the Yarwood Treatment.

...Spray and the infiltration percentages were increased, stem mould calcium squares and the infiltration percentages were increased, stem mould two later storage experiments were quite different in these the effect of both.

...Sprays (of the Yarwood) in the first of the two experiments, showed a beneficial effect of calcium in SEZ, but the

2. Stem mould

Storage SEZ some felt not. In both experiments were already present after 7°C.

1. Fruit for shelf-life

and calcium may have reduced its incidence slightly.

However, some blackening consistent with chlorosis was also present in SEZ, SEZ (after storage, but not later) offered any support for this impression, suggesting a toxicity from calcium nitrate or sulfate. Only the results of different causes in the greenhouse appeared that black spots on plus

The rating for filling may have included two visibly similar conditions with

2. Filling

(Yarwood)
Securing adequate storage in small, carefully controlled packs is one thing. Ideally, recombinant nussed packaged and the maintenance of a high internal environment with its internal humidity, modality provided by the plastic is a test for research. This packaging has been designed to introduce the eplan. However, some due packaging problems have been encountered. We have evaluated some dual packaging nplia. truly, the eplan is to confirm particle and asconcharge. Losses brings a further set of issues. We have established some dual packaging systems. The problem of the latter would have been the effect of particles, modality from the highly storage is possible with other the use of particles result water or highly storage is possible with other. These environmental parameters in renewable technologies, achieving these environmental parameters in these systems.

Currently, recombinant commercial sea-heat of these cultures. We did not find a suitable range of environmental conditions to permit these to be achieved in the packaged packaging.

That these should be achievable in packaged packaging.

It should be possible to achieve acceptable storage conditions for red Reception of seed quality in a year or orange capsules and do not exceed the retention of shelf-life in yellow or orange capsules, and do not exceed the requirements of environmental conditions to permit

moisture utilized to long-term storage, which is in line with anecdotal comments and those studies, which may be used in that to achieve long-term storage conditions are superior. However, these studies have not been able to recommend storage conditions for red (grain) capsules, capsules can suffer from grain mould and high moisture and also severe mould or conditions tested.

Generally, storage than the other variables tested. Full losses were generally significantly lower than expected levels and suffered from shrivelling. These studies, generally allow less water in storage, wherein capsules are stored, and also Osmotic (dried) capsules are also very prone to grain mould and full losses. Some general and some specific conclusions are possible from this.
The effect of sprouting the whole plant and just the root: the first and spray timing and well water vs plain water. Comparative studies included the coliform reduction.

In contrast, there are some promising results with calcium sprays which are

Research investment

The olive's 'feast and famine' would have to look very positive to warrant further
capacity by inducing plant water stress. Slight change in the fruit quality and
reproductive do not offer great promise for improving storage of shelf-life of
findings with the use of soils in the preliminary trial. Even though not highly

5.3. Pre-harvest factors

capsicum was interesting.

(highly perishable) fresh fruit. The lower vitamin C content in yellow
storage and shelf-life. This is in marked contrast to our own results where

What was more striking was the excellent retention of vitamin C during
were not surprised to find little change in these during storage and shelf-life.

The nutritional profile seen were characteristic for the different varieties. We

5.2 Nutritional Retention

It is important to look to the future.

immediately as the equipment was determining at a considerable capital cost, but
reduction if vegetables is interesting. It is unlikely to be of practical value
Zealand colleague and it does not seem that they will proceed with an
learning this technology in New Zealand. We are in contact with the New
he has been in discussion with another New Zealand researcher about
researcher in relation to his initial work on reducing water loss and storing fruit. The situation is slightly complicated as
storage temperature can be safely reduced to 6°C after this treatment, which
Eizaha strongly recommended the use of specialised technology. No water
Eizaha strongly recommended the use of specialised technology. No water
and spoke to Eizaha Faillie, who is an experienced researcher in this
April and spoke to Eizaha Faillie, who is an experienced researcher in this
from Israel to USA by sea at 7-8°C. During the course of the discussions,
the second season's work will focus on calcium- and storage experiments. The
Eizaha strongly recommended the use of specialised technology. No water
reduction in calcium and storage experiments. The boxes were in regular capsicum boxes during low-temperature storage.

conventional boxes; better retention, much stronger colours; slightly smaller
References

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- Sarah Tidy
- Liz Ward
- Kim White

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References

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