

# The StePacker NEWSLETTER



Issue 22 | Spring 2014

## Notes from our editor

Ringing in the spring season with new beginnings – meet Deborah Meidan, StePacker's new editor.

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## Understanding Crate & Box Design

From protecting fragile produce to facilitating quick, efficient cooling, box design plays an important role in delivering top quality produce.

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## Recent Xtend® Arrivals in Holland

StePac's integrated post-harvest approach incorporates routine inspections of Xtend® packed produce arriving at receiving ports and importers facilities.

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## A Focus on StePac's R&D Team

Early on in its 20 year history, StePac realized the hard way, that sustained success of Xtend® packaging requires a holistic approach.

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## Post-harvest Pathology of Green Beans

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February 5-7, StePac was a proud exhibitor at Fruit Logistica Berlin 2014, the fresh produce industry's largest trade show where the world's leading growers, retailers and wholesalers meet to exchange ideas and increase market reach.

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# From the editor's desk

By Deborah Meidan

## Dear readers and colleagues

Having joined StePac just a few months ago, I am pleased to take over the role as editor.

I thank Andy Swersky for her tireless work and look forward to continuing to share with you each quarter our exciting StePac news that affects our fascinating and fast changing industry.

In this edition, we discuss good carton design and a supply chain focus that investigates what you need to know about how produce fairs during ocean transportation. Also highlighted are our inhouse, post-harvest laboratory - a unique added value feature to StePac; and our participation in the trade show Fruit Logistica Berlin.

I welcome your feedback and wish you a pleasurable read.

Best Regards,

Deborah Meidan  
Deborah@stepac.com



# Crate and Carton Design: It's more important than you think.



By Ivo Tunchel

From protecting fragile produce to facilitating quick, efficient cooling, box design plays an important role in delivering top quality produce.

## Crate and carton

Manufacturers often don't have the post-harvest expertise required to fully understand the role that design plays in protecting and preserving fragile fruits and vegetables. Therefore it is vital that growers and packers provide their input during the design process.

Ivo Tunchel, StePac's South America Territory Manager, has many years of experience helping growers and packers improve their post-harvest practices. He provides here a check list of the major factors that should be taken into consideration when designing and choosing produce crates/

cartons:

- Type of produce
- Cooling method used
- Pallet construction
- Transport methods

## Type of produce: size, shape & material

If crates/cartons are not properly designed for the size and shape of the produce inside, skin damage may occur (fig 1, 2, 3). In particular, when using plastic crates special attention should be paid to the size and shape of the vent holes and the smoothness of the edges.

## Carton strength

Factors to consider include:

- produce being packed

- produce weight per carton
- stacking height
- pallet dimensions
- temperature & relative humidity during supply chain

Box manufacturers are experts at taking these factors into consideration, but it is essential that packers provide them with accurate information that includes worst case scenarios. Incorrect calculations can have costly consequences, endangering the integrity of the pallet structure and damaging the produce. Receivers of fresh produce are likely to charge for repalletizing and therefore cutting costs on carton strength (fig 4) can prove more expensive!

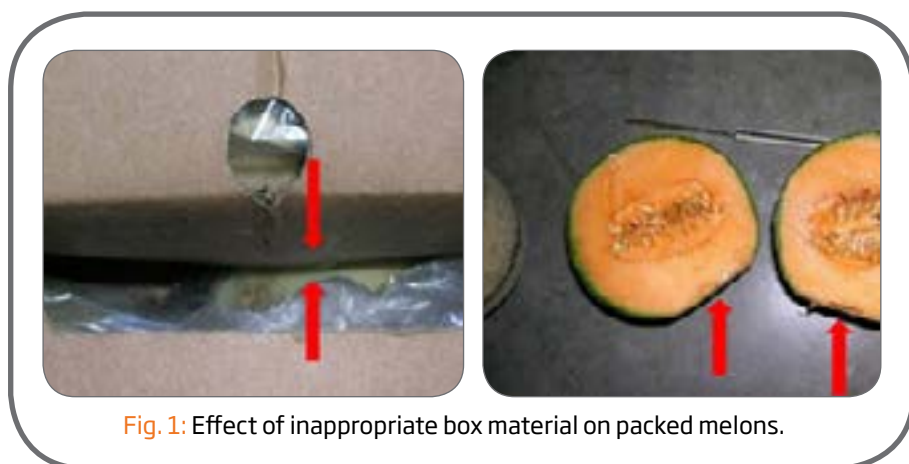


Fig. 1: Effect of inappropriate box material on packed melons.



Fig. 2: Skin damage from vent holes.

Fig. 3: Damage caused by plastic crate being pressed against the fruit's skin.





**Fig. 4:** Pallet cannot support the weight due to weak, poorly designed cartons. The sagging cartons obstruct ventilation and are likely to cause damage to the produce.

### Air flow

Boxes should be designed to allow for adequate air flow, which together with cooling requirements are produce dependent. Insufficient air flow across cartons containing climacteric produce for instance may result in local temperature increases and build up of ethylene. On the other hand high air flow can result in excess dehydration of certain produce items.

The use of plastic liners impedes air flow and a carton that is well designed with sufficient ventilation for non-bagged produce may be unsuitable for bagged produce. For instance, bags will block vent holes in the base of the cartons, making them unnecessary.

When liners are used, the best solution is the use of open top cartons with large openings at

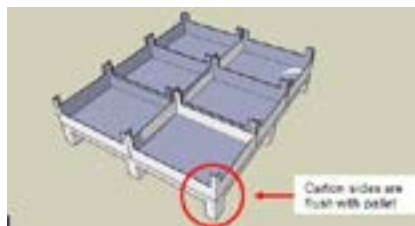
the top center of all four sides of the box, (fig 5). It is important the vents on adjacent cartons on the pallet are aligned. This solution enables unrestricted air flow across the pallets along both axis and optimum ventilation of both bagged and non-bagged produce.



**Fig. 5:** Large openings at the top center of each side of the carton provide unrestricted air flow across the pallet along both axes.

### Pallet construction

During the design phase, carton configuration on the pallet should be studied, as this can significantly affect air flow. Note that in the photos (fig 7) ventilation holes are present on the upper corners of the two short sides to ensure unrestricted air flow regardless of their positioning on the pallet.



**Fig. 6:** Boxes should be designed so that outer carton walls are aligned with the pallet base. This strengthens the pallet structure and will help prevent collapsing.

### Case study

The image, (fig 8) illustrates a poorly designed cherry box. Although the ventilation holes were large enough, they were completely blocked once boxes were placed on top of each other on the pallets. Consequently cooling time was prolonged and the temperature during shipment increased due to fruit respiration.



**Fig. 8:** Box with top ventilation holes that will be blocked when palletized.

The image below, (fig 9) shows a redesign of the same box in which additional holes were added to improve ventilation during cooling and shipment. The new configuration of perforations substantially reduced the time required for cooling by 30%.



**Fig. 9:** Cherry box redesigned to improve ventilation.



**Fig. 7:** Boxes that demonstrate how to best position on pallet.



## Cooling method used

The type of material used and the ventilation design is also dependent on the method of cooling.

**Hydro-cooling:** Wooden crates, corrugated plastic cartons (fig 10) and waxed cartons may be used.

**Forced air cooling:** Wooden crates, corrugated plastic cartons, non-waxed cartons. Unobstructed air flow across the pallet is critical.

**Passive cooling in Cold chambers:** Wooden crates, corrugated plastic cartons, non-waxed cartons. Ventilation design should take into consideration that incoming cool air is passively circulated within the chamber. Ventilation holes must be relatively large to allow heat of respiration from the pallet center to escape as quickly as possible.

**Vacuum cooling:** Wooden crates, corrugated plastic cartons, non-waxed cartons.



Fig. 10: Appropriate material and good design facilitate thorough hydro-cooling



Fig. 11: Bananas with chilling injury from being on the top row of a pallet.

**Ice packing:** Wooden crates, corrugated plastic cartons, waxed cartons. Special attention should be paid to the size of the vent holes so that ice doesn't fall out during transport.

## Transport methods

Different modes of transportation (trucks, containers, reefer vessels) use different means of air flow, (fig 12).

- In containers, air flow comes from the floor "T Bars" and flows upwards. If produce is packed in carton liners or plastic trays, ventilation holes on the base of the carton will be blocked and become unnecessary. In this case, the only option for ventilation is horizontal air flow and the box design should be revised to accommodate for this.
- In reefer vessels air flow is usually from the sides and bottom. Horizontal air flow must be extremely efficient to compensate for blocking of vertical air flow by liners.

• In trucks air typically flows from the top down and chilling injury of sensitive fruit on the top rows is a real risk, (fig 11) Excess dehydration of produce on the top layer is also likely. Good box design can help minimize or eliminate these problems. In addition, a layer of carton is often placed on the top of the pallet to prevent intensive contact of cool air with chilling sensitive fruit and reduce dehydration.

## Summing it all up

Working closely with carton/crate manufacturers to design the best carton/crate for your needs can reap significant rewards. While carton/crate designers typically focus on price and graphic artwork, your insights about handling, cooling/refrigeration and ventilation will ensure that your new box serves you well, effectively protecting and preserving your perishable cargo.

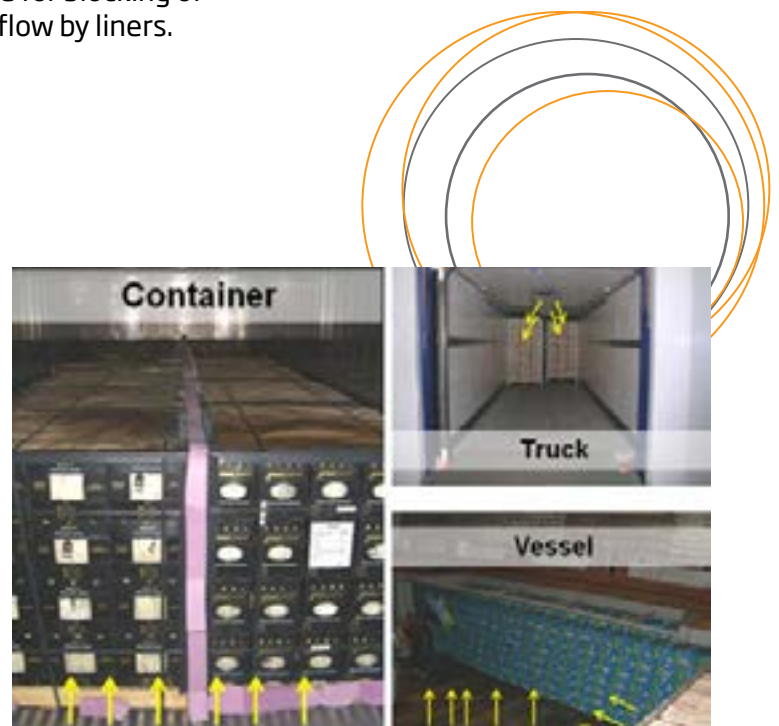


Fig. 12: Air flow in various modes of transport.

# Excellent quality of Xtend®-packed fruits and vegetables in recent arrivals to Holland

By Dr. Nadav Nitzan

StePac's integrated post-harvest approach incorporates routine inspections of Xtend® packed produce arriving at receiving ports and importers facilities. This important service enables StePac to better monitor and follow up on the performance of Xtend® packaging and reassures customers that their produce is arriving in prime condition.

In December 2013, we visited Holland and inspected sea freight arrivals of Xtend® packaged fruits and vegetables. Galia melons arriving in StePac's new laser perforated Xtend® liners had excellent flavor, superb rind and seed cavity form and a vibrant internal color. Similarly, passion fruits, packed in 2 Kg Xtend® packaging, arrived in excellent

shape, retaining their unique taste and aroma.

In this inspection we also examined green onion shipments from Morocco for the first time in three years. As can be seen in the provided images, green onions packed in Xtend® retained their freshness and rich green color without telescopic growth, curving, root regrowth or decay.

The outcome of this inspection highlights the superior MAP performance that the Xtend® product-line provides our customers.



Galia melons arriving in stePac's new laser perforated Xtend® liners.

# The R&D Team at StePac: Developing the best holistic packaging solutions

By Gary Ward & Deborah Meidan

Early on in its 20 year history, StePac realized the hard way, that sustained success of Xtend® packaging requires a holistic approach. As good as the packaging may be its performance is dependent upon numerous factors such as quality of the produce that is being packed and good postharvest handling, in particular sanitation, rapid and efficient cooling and good cold chain management.

One of the early awakenings was with cherries. We received reports of off flavors upon arrival of Xtend-packed cherries in Western Europe. Upon investigation, it turned out to be due to unfavorable gas conditions developing in the packaging as a result of high supply chain temperatures - the package was designed for storage and shipment at 0°C. This costly event taught us several lessons:

- We need to make sure that we fully understand our customers supply chain and that we can deliver a solution that provides added value under the existing conditions. Postharvest supply chains are not always optimal and temperature abuse can and will happen.
- We need to strive to optimize

both the customers supply chain and our packaging and thereby improve performance.

StePac has since established a broad spectrum technical support program implemented by highly experienced agronomists and postharvest specialists that work closely with customers and are backed up by StePac's R&D team in Israel.

The company's R&D team comprises highly qualified and experienced polymer engineers, postharvest scientists and a plant pathologist. They are not only responsible for development of new products to meet the customer's needs, but also validation and fine tuning of existing products, comparison of packaging performance with those of competitors, evaluating means for control of postharvest

decay caused by molds, yeasts and bacteria and identifying new, innovative solutions that bring added value to StePac's customers by complementing Xtend® packaging.

The fruits of their labor are the most suitable packaging solutions coupled with the optimal postharvest handling protocols. This approach makes StePac unique amongst modified atmosphere packaging suppliers in the postharvest industry.

The R&D team performs all of the aforementioned tasks in StePac's postharvest and polymer lab in Israel. The lab has 9 cold storage chambers, state-of-the-art postharvest equipment, tools and equipment for analyzing polymer properties and an embedded microbiology lab.



StePac's postharvest and polymer lab in Israel.

# Postharvest Pathology of Beans

By Nadav Nitzan, Ph. D.

The most common diseases affecting bean pods are Gray Mold (*Botrytis cinerea*) (Fig. 1), and White Mold (*Sclerotinia sclerotiorum*) (Fig. 2). Other diseases may be pod russetting (*Plectosporium tabacinum*) (Fig. 3), Rhizopus rot (*Rhizopus stolonifer*), Pythium leak, and Alternaria rot. These fungal pathogens are field-borne and may cause disease in the field reducing yield. However, due to latent infection they frequently are troublesome in storage. Therefore, it is essential to correctly manage disease in the field prior to harvest.

Following harvest, pods should be handled with care to avoid skin injury, and hydro-cooled

to 5-7.5°C to remove field heat (Fig. 4), prevent water loss, minimize the incidence of decay and prevent rapid deterioration in quality. During storage, temperature should be maintained at 5-7.5°C with 95-100% relative humidity. Nevertheless, temperature should not drop below 5°C, otherwise chilling injury, symptoms of which include rust-discolored spots on the pods, will occur (Fig. 5). In addition, avoid exposure to ethylene as loss of green pigmentation and increased browning are likely to occur.

StePac offers bulk and retail packaging for a variety of bean types (Figs. 6 & 7). Our Xtend®

MA/MH packaging preserve color and glossy appearance, reduce dehydration of pods due to modified humidity, preserve firmness and prevent shriveling. The modified atmosphere reduces decay and mitigates russetting and other chilling injury symptoms. Packing beans in StePac's Xtend® Modified Atmosphere/Modified Humidity Packaging is therefore advantageous, preserving field fresh flavor and nutritional value during prolonged storage, reduces waste in the supply chain, facilitates market expansion and sea and land transport.



**Fig. 1:** *Botrytis cinerea* (Gray Mold) sporulating on bean pod. Photo Source: Carrie H. Wohleb, Washington State University, Vegetable Pathology Program



**Fig. 2:** *S. sclerotiorum* (White Mold) on bean pods. Notice the white



**Fig. 3:** Bean pods infected by *Plectosporium tabacinum* demonstrating russet symptoms.





Fig. 4: Postharvest hydro-cooling of green bean pods.



Fig. 5: Rust like discolored spots on green bean pods indicative of chilling injury.

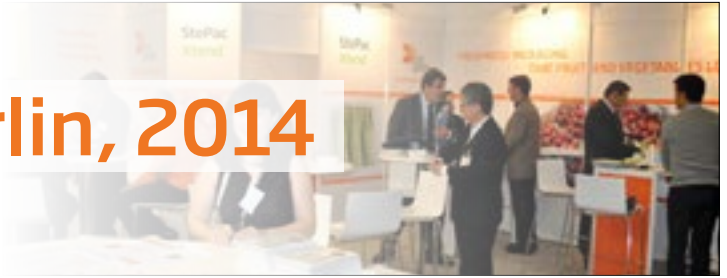


Fig. 6: Xtend® Bulk packaging for beans.



Fig. 7: Xtend® retail packaging for green beans.

# Fruit Logistica Berlin, 2014



By Deborah Meidan

StePac was a proud exhibitor February 5-7 at Fruit Logistica Berlin 2014, the fresh produce industry's largest trade show, where the world's leading growers, retailers and wholesalers of fruit & vegetables meet to exchange ideas and increase market reach under the hospices of Messe Berlin's Convention Center.

"StePac is a global company

with commercial activity in over 42 countries. Therefore, Fruit Logistica is the perfect venue for Stepac to speak directly with customers and generate new leads", says Assaf Shachnai, Stepac's VP Sales & Marketing. "We were happy to meet hundreds of people who visited our booth and look forward to developing new business relationships."

This year StePac unveiled newly

developed pallet shrouds as well as a new film structure which is suitable for bulk packaging applications with a wide range of fresh produce items and is complementary to StePac's portfolio of products.

**To follow up with StePac or hear more about our products, send us an email: [info@stepac.com](mailto:info@stepac.com)**



**Fig. 1:** The StePac booth at Fruit Logistica Berlin, 2014.



**Fig. 2:** Cantaloupe melons in the new packaging design shipped from Brazil and inspected in Europe.



**Fig. 3:** StePac Xtend® pallet shrouds for selected produce items.