Flowers for Sea Shipping to Ensure Customer´s Satisfaction

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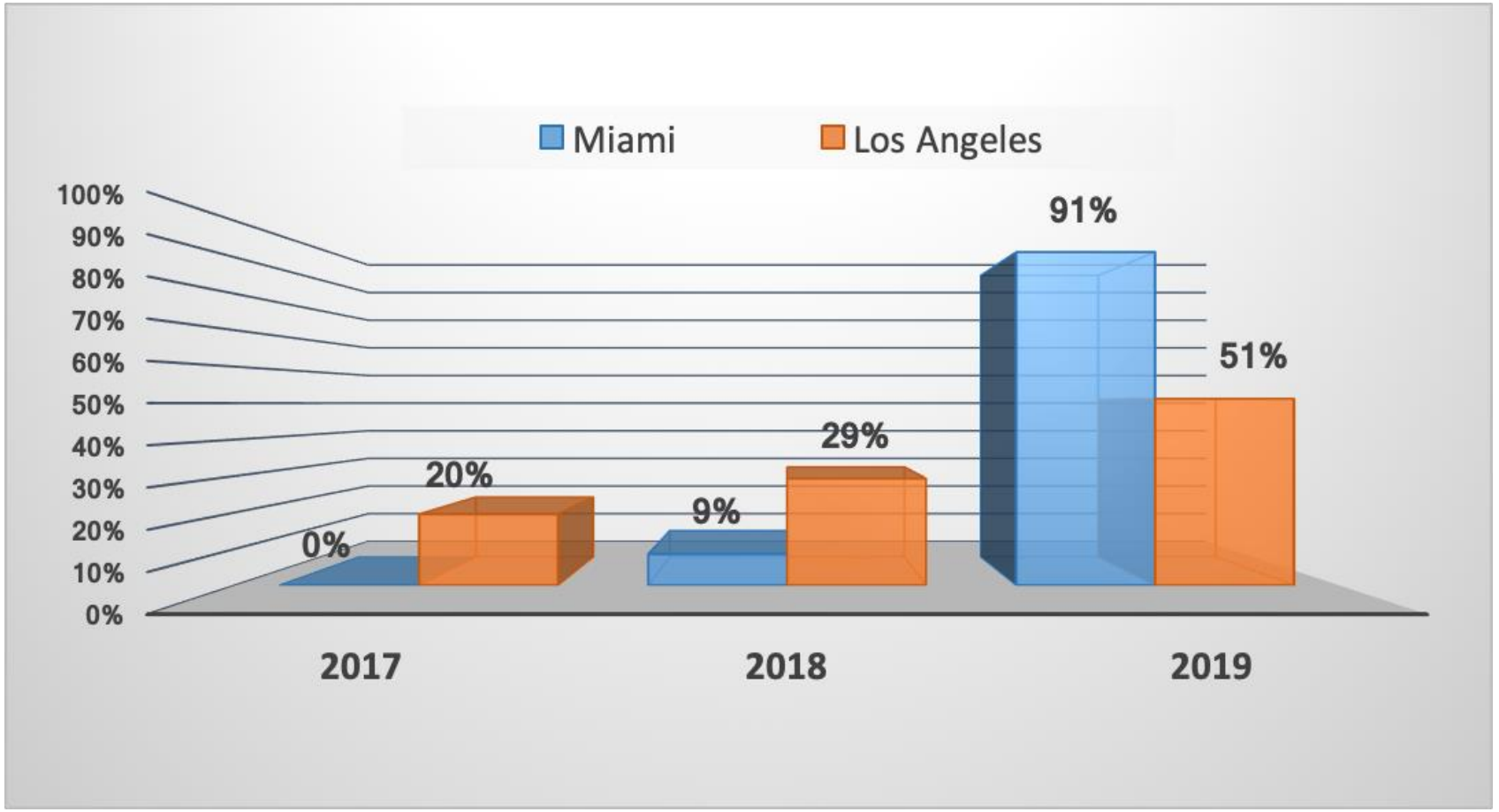
SMITHERS-OASIS

Dependency on air lift transport for floral products

- Fuel surcharges
- Lack of available cargo space
- Covid 19 impact - flight availability
- Increased demand at peak floral holidays

Popularity of Sea Shipping is Increasing



Sea Containers work, HERE is how ….

- Transit times – short vs long dynamics
  - BOG-MIA: 9-12 days
  - BOG-PHI: 11-13 days
- Sustainability:
  - Initial research does show a beneficial “Carbon footprint” benefit (depending on channel – Supermarket vs. Ecommerce vs Wholesale)
- Cost differential:

What are the COST Differences / Logistical Issues Facing Sea Shipping? ---- Is there a SAVINGS ??

- Alleviate pressures off air movement
- Time of year factor
- Cost of travel and service from BOG, QUI or MED to port
- Cost of port handling in LAR (Latin American Region)
- Cost of clearing
- Cost of trucking within USA

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Things to consider for successful sea container shipping

- Short lived flowers
- Some varieties are more tolerant long-term shipping
- Flowers packed in traditional boxes
- Leaf yellowing
- Drying out
- Botrytis

Steps For Success

- Growing conditions and postharvest treatments
- Packaging and boxing
- Cooler requirements
- Transport from grower to sea container
- Sea container requirements
- Handling of boxes upon arrival

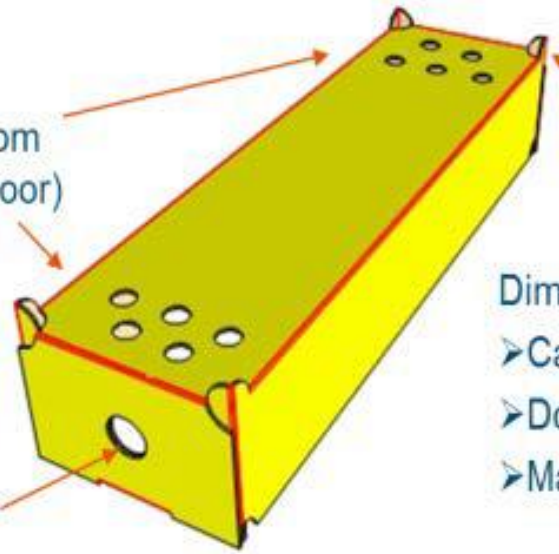
Rose Grading and Packaging

- Bunching
  - Number of stems per bunch
  - Stem length
- Sleeves
  - Type and density
- Pack cold flowers into cold boxes
- Number of flowers
  - Bunches per box
  - Air circulation measurement
- Box design
  - Precooling and air exchange holes
- Liner for boxes
  - Prevents dehydration during shipment

Postharvest Hydration and Packaging

- Water quality
- Full hydration prior to packing (full 12 hours)
- Cool quickly and thoroughly
- All proper commercial postharvest solutions mixed fresh, measured and verified

Sea Freight Box Design – Holes on All Sides



Holes (approx. 3%) in lid and bottom for vertical cold air supply (T-bar floor)

Corners to line up boxes

Holes for horizontal cold air supply (pre-cooler)

Dimensions to be chosen dependent on needs

- Cartons should not stretch over pallet edges
- Do not exceed max stowage height of 242 cm
- Make sure pallets or liners do not block holes

Box Compression Value dependent on needs

e.g. between 5000 and 6000 N

Keep Flowers Very Cold (1 C)...From Postharvest to Arrival

- 3 days transport at 10º C equals a temperature sum of 30 degree days
- 30 days at 1º C equals also a temperature sum of 30 degree days

Special Cooling Facilities Required

- Sanitized air handlers and walls, floors and drains (quaternary ammonium wash)
- Precool to 0.5º F (0.5 - 1º C constant no interruptions or flux)
- 75 - 80% RH
- Adequate air exchange
- Cool boxes prior to packing
- Cooler needs to hold full container (900 ½ boxes)

Infrastructure on the Grower Side

- Cooler (0.5˚ F) - enclosed dock for loading. Constant temperature measurement
- Pallets - insect-free and sealed – slat type to allow bottom air exchange
- Corrugated boxes providing 4-way air exchange and corner stacking design
- Chilled water, water quality for postharvest
- Macro micro perforated sleeve design
- Clean postharvest area with proper solutions, buckets, low temperature hydration and packing

Transport from Farm Loading to Container Loading

- Temperature and humidity management
  - Use of temperature logging units
  - Recognize receiving condition and rea
- Loading and unloading protocols
  - Need to prepare to receive
  - Cooler space – pre-cooler
  - Relative humidity and hydration
- Inspection process pre-loading preparatio
  - Setting up container for receiving

Sea Container Parameters – Available Settings and Type Needed

- Initial cleaning and sanitizing of the container
- Temperature (0.5˚ F +/- O.5˚ F)
- Humidity management (80 – 85%)
- Air exchange (2 exchanges/hour)
- Vibration (how to measure)

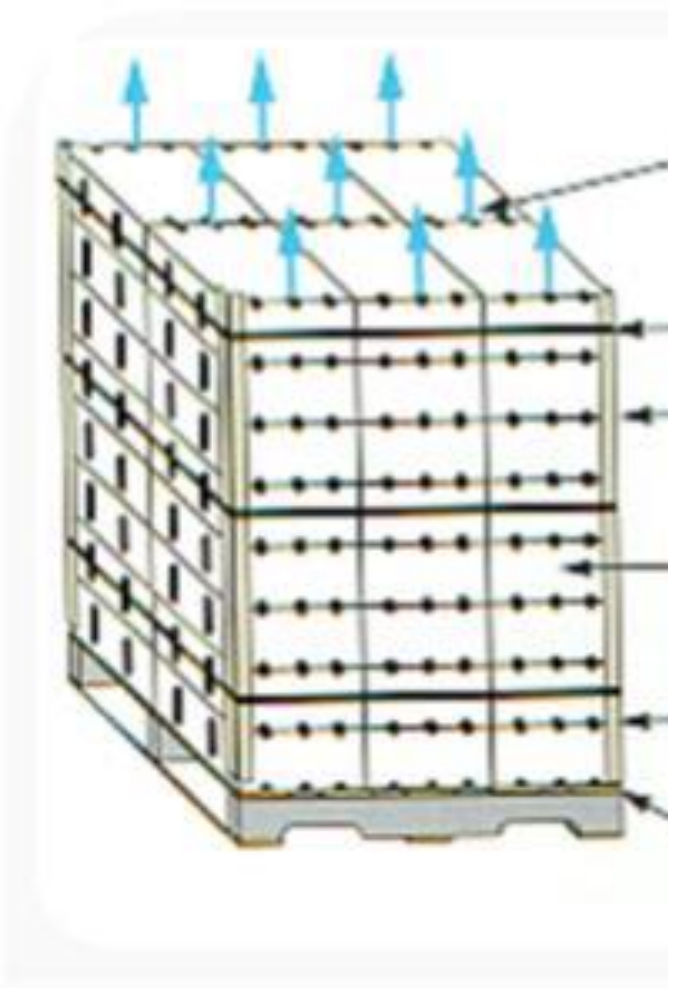
Other Set Points for the Container

- Ventilation/Fresh air exchange: 20 m^3/hr
- Drain holes open and clean
- Humidity control: OFF
- Defrost cycle: automatic / constant cycle

GENTEC - Effect of Shortage of Units in Colombia and Ecuador

Note how pallets made of boxes become one unit

Pallet Loading Protocol



Boxes vented for vertical air flow

Pallet load is secured

Box vents align

Fiberboard is strong enough for high-humidity conditions

Boxes do not extend beyond pallet

Deck board spacing allows vertical airflow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Arrival at US port of entry

- Inspection
- TSA / PQ / USDA Customs
- Travel and handling to your facility
- Your cooler and precooler preparation
  - Temp 1˚ C
  - Sanitize precooler
  - Have space ready to handle up to 900+ cases
- Pre cooling - protocol needed and inspection of relative humidity
- Rehydration / Handling / Rotation and review of marketplace
- Not always FIFO - use of reverse rotation?

Rehydration of Flowers and Processing for Next Phase

- What channel are flowers for?
- Location of use
  - Get as close to market as possible to hydrate
- Duration and temperature
  - Slow chilled rehydration (overnight) is recommended, allow vascular system to recuperate and take advantage of your properly selected solution and its designed chemistry

Final points:

- Work with knowledgeable partners across the supply chain
- Select a cultivar of cooperative flower types
- Proper Solutions at post harvest and cool product as soon as possible after (include shipping materials)
- Keep the temperature as low as possible (0.5˚ C) in the whole chain. Below this temperature, flowers could show chilling injury and freezing symptoms
- Avoid higher temperatures and temperature fluctuations as these stimulate senescence and/or *Botrytis* development
- Prepare - before loading the boxes in the reefer container / Clean / Set and Chilled to .05 C / RH% and Air exchange settings

Final points continued:

- Use boxes and pallets designed for reefer transport
- Measure and log temperatures of product and cold storage facilities if cross docked to monitor any temperature issues occurring in the production chain
- Look for new Technologies – use of Pre-Cooling and storage / rotation / movement
- Be prepared for receiving and rehydration

Further Information

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