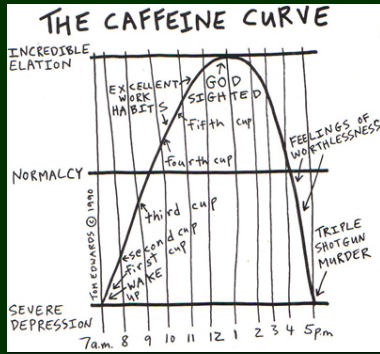


## Are you a Grower or a Manufacturer?



Hit the peak of your efficiency!

Paul Fisher  
[pfisher@ufl.edu](mailto:pfisher@ufl.edu)

**UF** UNIVERSITY of FLORIDA  
 IFAS Extension <sup>1</sup>

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## Outline

1. Apply practical lean manufacturing concepts
2. Track shrinkage



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## The goals: consistency, efficiency, and profitability

- Uniform quality
  - Across a tray
  - Across a bench
  - Over time



- We are plant factories, with little room for "art"

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## Young Plant Production Processes



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## Analysis of peak week of sticking

1,600,000 cuttings during peak week	Worker hours per week	Worker cost per hour	Cost per week	Cuttings/worker hour
Receiving, organizing and delivering	24	\$ 13.00	\$ 312	66,667
Filling trays	40	\$ 11.00	\$ 440	40,000
Sticking line supervising	80	\$ 11.00	\$ 880	20,000
Sticking cuttings into tray	1,200	\$ 10.72	\$ 12,864	1,333
Moving cuttings to greenhouse	120	\$ 11.00	\$ 1,320	13,333
Total process	1,464		\$ 15,816	1,093
Sticking and sticking supervising	1,320		\$ 13,744	1,250
Other processes (not sticking)	144		\$ 2,072	8,696

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## Time and labor cost per cutting

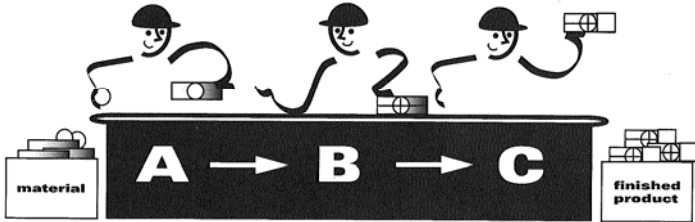
Per Cutting	Seconds	Labor cost	% of cost
Receiving, organizing and delivering	0.05	\$ 0.0002	2%
Filling trays	0.09	\$ 0.0003	3%
Sticking line supervising	0.18	\$ 0.0006	6%
Sticking cuttings into tray	2.70	\$ 0.0080	81%
Moving cuttings to greenhouse	0.27	\$ 0.0008	8%
Total	3.29	\$ 0.0099	100%
Sticking and sticking supervising	87%	87%	81%

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## Apply Practical Lean Manufacturing Concepts

### continuous flow



- Google lean flow manufacturing for ideas

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## "Stage 0": Product assembly (filling, sticking)



- Containers/Hour standards, Incentives?

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## Counting the beat Track how long required for each task & allocate staff accordingly



The longer the process takes, the more people helping in that task.

Observe bottle necks



Time-motion studies

Or figure out how many units per # people per hour

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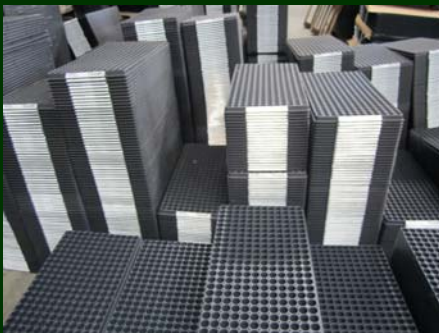
## Go with the flow Link processes together in stage 0 and shipping



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## Just in time Work in a flow like in a pipeline, not in a series of batches.



Uses less space, less plant damage in shipping,  
less double handling

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## Examples for shipping

- Shipping labor understands quality specs

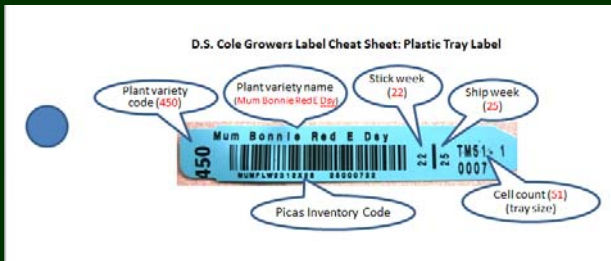


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## Examples for shipping

- Shipping labor understands quality specs
- Training on reading labels



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## Examples for shipping

- Shipping labor understands quality specs
- Training on reading labels
- Master pulls

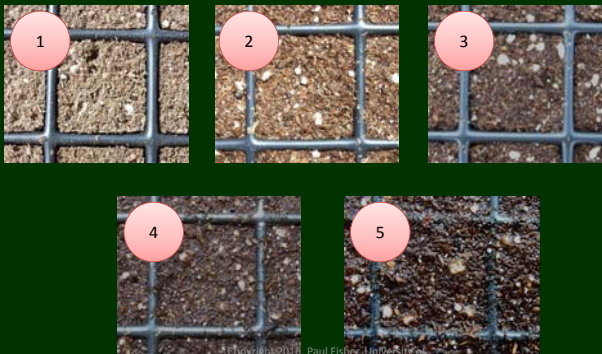


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There is always some art in growing  
But some standardization is possible

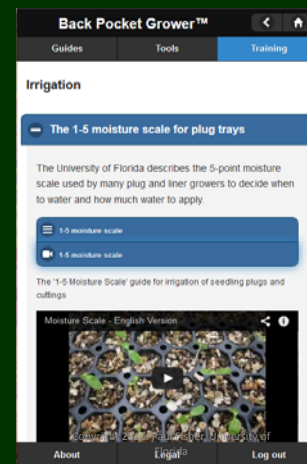
How wet is wet?



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## Moisture levels – see BackPocketGrower.org

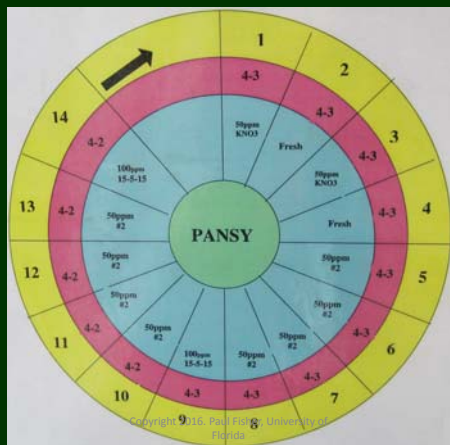


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## Using moisture levels

(Ball Tagawa, Colorado)



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## Documenting growing processes

CROP	OPTIMUM GERMINATION TEMP		GERM ROOM	VERMICULITE COVERING
	F°	C°		
ABELMOSCHUS	72 - 75	22 - 24	NO	YES
ABUTILON	68 - 72	20 - 22	NO	YES
AGERATUM	75 - 78	24 - 25	NO	YES
ALTERNANTHERA	72 - 76	22 - 24	NO	YES
ALYSSUM	78 - 82	25 - 28	NO	NO
AMARANTHUS	70 - 75	21 - 24	NO	YES
AMMI MAJUS	72 - 75	22 - 23	NO	YES

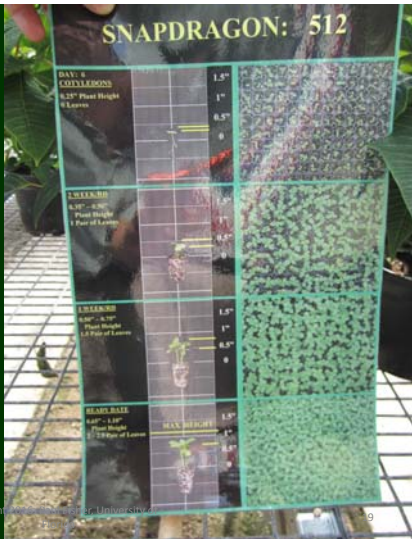
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If you can't explain the path to grow a great product...

- Can you repeat it each time?
- Won't new staff get lost?



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## Communication – grower to production staff



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## Communication – grower to production staff



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## Document “tribal knowledge”



Then cross-train staff to become flexible employees

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## One step at a time: Break production processes down into a series of tasks

- For key processes:
- Document the steps
  - What to measure?
  - What are acceptable standards?
  - What actions to take?
  - How often will the task be done?
  - Who is going to do the task?
  - Who will check standards are met?
- Train required skills and understanding
- why are these standards important?

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## An example: chlorine level in irrigation water



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## I didn't agree to that! It's yours not mine Team buy in for quality standards

Developing  
Ellepot  
quality  
standards



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## One step at a time: Break processes down into a series of tasks



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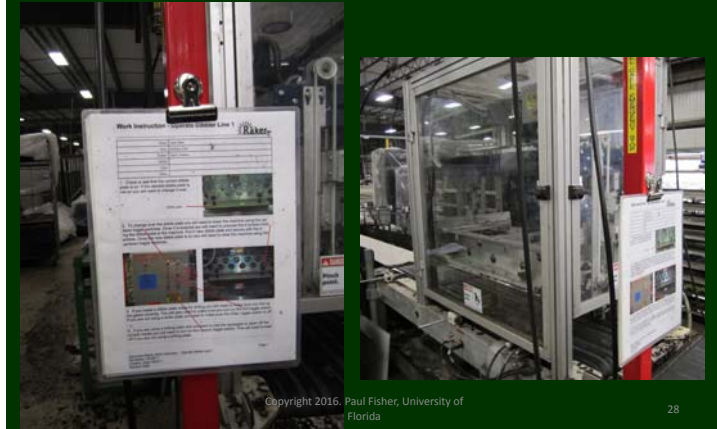
## One step at a time: Break processes down into a series of tasks



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## One step at a time: Post work instructions at the job location



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## How high should I jump? Every task has a key performance indicator

### Cleaning standards

#### Area

Bucket Storage

#### Standards

Buckets are empty, returned to home and stacked neatly  
Carts are returned to home  
Brooms are put away in broom container

#### Area

Dump Bin

#### Standards

Floor is clear of dirt and trash  
Trays are dumped and stacked on pallets  
Wall behind dump bin is free of media  
Dump bin is emptied



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## Communicate what action to take when standards are not met

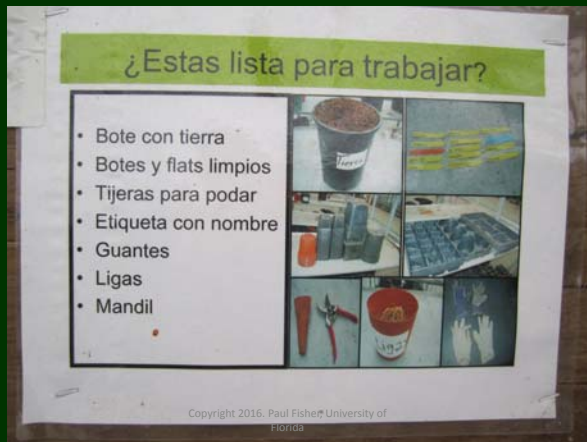


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## Communicate Safety



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## Organize the Work Space



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## A place for everything, and everything in its (labeled) place



33

## A place for everything, and everything in its (labeled) place

Restock tag on supplies



34

## A place for everything, and everything in its (labeled) place



35

## Don't crowd me out Delineate spaces for safety & efficiency



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## Don't use work space for storage



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## Keep commonly used supplies close by If you haven't touched it in a year, store it elsewhere



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## An efficient and clear work space



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## The right tool for the job Evaluate fiddly and repetitive tasks



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## The right tool for the job Evaluate fiddly and repetitive tasks



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## Track Productivity

NAME	8:00	9:00	10:00	11:00	12:45	1:45	3:
1 Eucrosia	6	7					
2 Julia	3						
3 Maritza	6	5					
4 Hilba	3	3					
5 Delia	8	10	8	9	10	10	1
6 Floya	9	10	9	10	11	12	1
7 Ana	8						
8 Aurora	4	4	5	4	7	6	0
9							
10							
11							
12							

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## Making progress with efficiency

You can't do everything at once,  
but you can do something at once



## 2. What is shrinkage? Any reason plants are grown but not successfully sold



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With thanks to Dr. Charles Hall, Texas A&M

## Are you tracking shrinkage?

- Key aspect of inventory management
- When any material is tossed or rejected, it should be tracked to at least three levels of "loss code":
  - Internal production loss
  - Produced but not sold
  - Credit on sale



## Types of shrink: 1. Internal production losses

- Partial trays
- Poor germ/rooting
- Disease, insect damage
- Chemical/PGR damage
- Not to specification



## Types of shrink: 2. Unsold product

- Cancelled orders
- Speculation over-produced



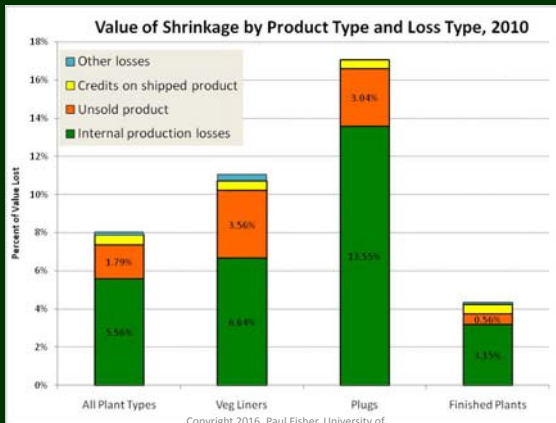
## Types of shrink: 3. Credit on shipped product

- Damage from shipping, heat, or cold
- Poor plant quality
- Other (unspecified) credits





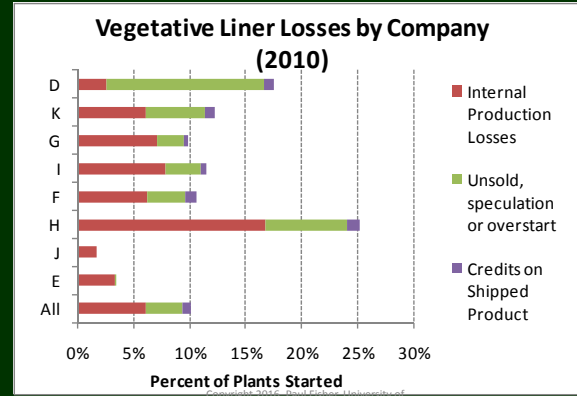
## Average shrinkage across several growers



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## Companies vary a lot!!



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## Have a simple tracking system

Product type	# Units	Value/ Unit	Loss Code	Comment	Value
1-liter heuchera	26	\$1.25	Production loss	Root rot ( <i>Phytophthora?</i> )	\$32.50
2-liter hebe	250	\$2.00	Unsold product	Customer order cancelled	\$30.00
50-count petunia liners	50	\$0.50	Credit	Wrong variety shipped	\$25.00

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## Shrinkage affects your bottom line

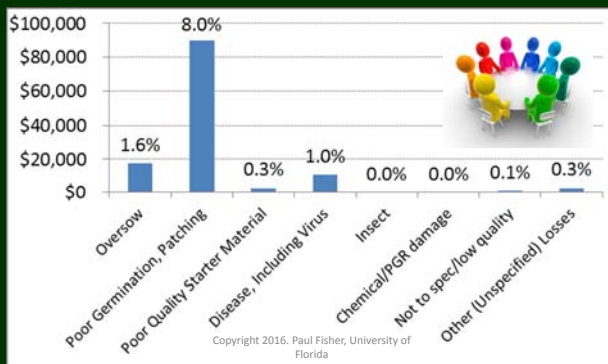


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## Use the data

- As a production team, set goals and analyze "What can we do about it?"



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# THANK YOU!

