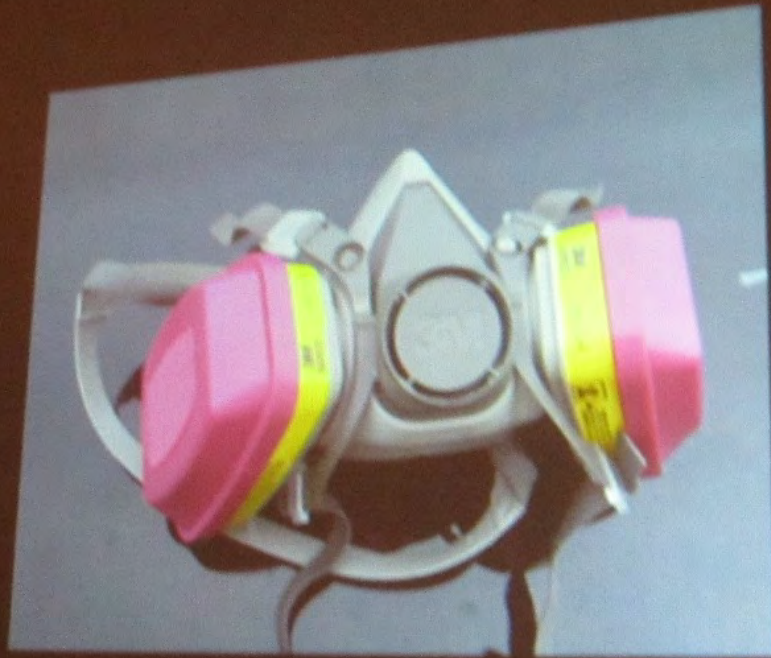


# Pros and Cons

- Pros
  - Very inexpensive overall and per colony
  - Effective (when used properly)
  - Natural and Organic
  - Acceptable for small-scale and commercial beekeepers
- Cons
  - Health concerns if not used properly
  - Can be hard on the bees and brood when used incorrectly
  - Can (easily) be used improperly (more is NOT better)
  - Depending on technique- time intensive

# Safety

- This is a corrosive acid!
- Always use gloves and eye protection
- Respirator rated for organic vapors (OV) is a **MUST!**



# Hazards

- **Fire Hazard**
  - Special Hazards of Combustion Products: **Generates poisonous gases** (USCG, 1999)
- **Health Hazard**
  - As dust or as a solution, can cause severe burns of eyes, skin, or mucous membranes. Ingestion of 5 grams has caused death with symptoms of nausea, shock, collapse, and convulsions coming on rapidly. Repeated or prolonged skin exposure can cause dermatitis and slow-healing ulcers. (USCG, 1999)

## How OA Works

- We don't know!
- Current theory
  - Direct contact kill varroa not ingestion by honey bee
  - Higher doses (% solution) reaches maximum kill at 4.2 (considered "hot")

# Equipment

- Dribble Method
  - OA
  - Sugar
  - Distilled water
  - 60 cc syringe
  - Nitrile gloves
  - Safety Glasses/Goggles
- Vaporizing
  - OA
  - ¼ tsp measuring spoon
  - Battery source (12v car battery)
  - Damp/wet towel to cool vaporizer
  - Dry towel/rags to stuff/close openings
  - Timer
  - Respirator with cartridges rated for organic vapors

# Dribble Application

- Dribble Method
  - Treat with 5ml of solution per seam of bees
- Recommended dose is 50cc per colony
- Use a 60cc syringe from a feed store (tractor supply etc)
  - For larger numbers of colonies a hand pump garden sprayer can be calibrated and used.
- Most effective when used during a brood-less or no closed brood period (usually November/December in most temperate areas)

Oxalic acid crystals dissolve more readily in hot water than in sugar solution.

Tip: dissolve the oxalic crystals in the indicated amount of hot (150°F) (distilled) water before adding the sugar.

After the oxalic crystals are *fully dissolved*, *only* then stir in the sugar.

Oxalic strength→	"Hot" 4.2% w:v	"Medium" 3.2% w:v	"Weak" 2.5% w:v	Notes
OA crystals	1	0.75	0.6	Oxalic crystals must be measured by weight. Sugar and water are about the same by weight or volume (1 pint of either granulated sugar or water weigh 1 lb)
Sucrose	10	10	10	
Dist. Water	10	10	10	
OA crystals	60g	45g	35g	Makes 1 liter Treats about 20 colonies
Sucrose	600g	600g	600g	
Dist. water	600ml	600ml	600ml	
OA crystals	100g	75g	60g	Makes 1700ml Treats about 33 colonies
Sucrose	1 kg	1 kg	1 kg	
Dist. water	1 liter	1 liter	1 liter	
OA crystals	232g	174g	139g	Makes 1+ gallon Treats about 75 colonies
Sucrose	5 lb	5 lb	5 lb	
Dist. water	2.5 qt	2.5 qt	2.5 qt	
OA crystals	1112g (2lb 7oz)	834g (1lb 13.4oz)	667g (1lb 7.5oz)	
Sucrose	25 lb	25 lb	25 lb	Makes 5 gallons Treats about 375 colonies
Dist. water	3 gal	3 gal	3 gal	





# Dribble Method Pros and Cons

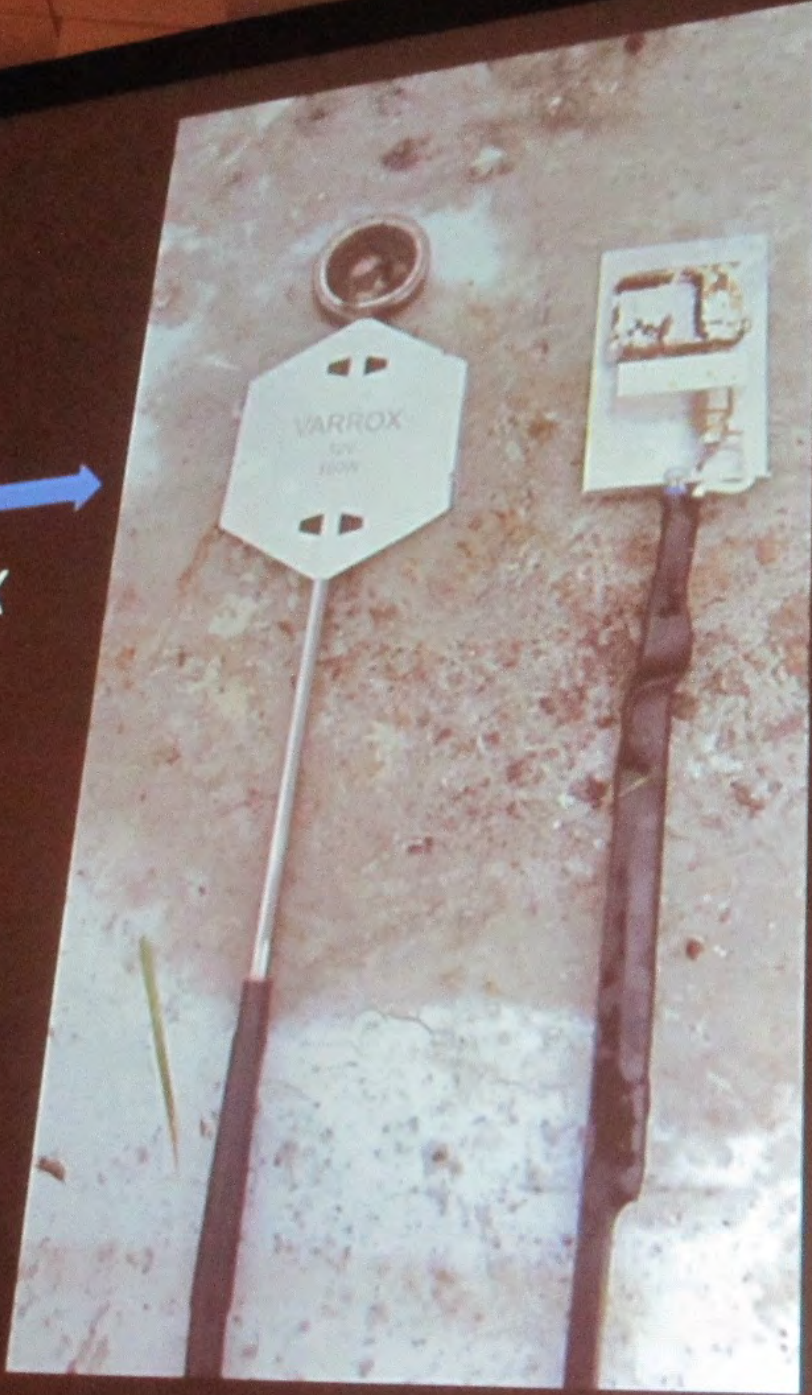
- Pros
  - Very safe (no vapors)
  - No special equipment
  - Easy to mix quickly
  - Minimal treatment time
- Cons
  - Cannot be used frequently
  - Limited life once mixed
  - May require lifting of hive body
  - Works only on phoretic mites

# Vaporization Application

- Vaporization Method
  - Treat with 1 gram ( $\frac{1}{4}$  tsp) of crystals per hive body
- Need to use a vaporizer
- Also required:
  - 12v car/motorcycle battery
  - Respirator rated for OV
- Can be used during brood-less and brood present time periods



Varrox



Heilyser



VARROX

12V

150W

VARROX

12V

150W

## Vaporizing Technique

- Add OA and insert vaporizer into bottom of hive
- Close off all openings (including SBB) with rags etc
- Connect to battery and wait 2 ½-3 minutes (varies with each vaporizer)
- Disconnect vaporizer and let sit for another 2 ½ minutes
- Remove vaporizer and close off entrance and let sit closed for 10 minutes then remove closures
- Cool off vaporizer and repeat with next hive



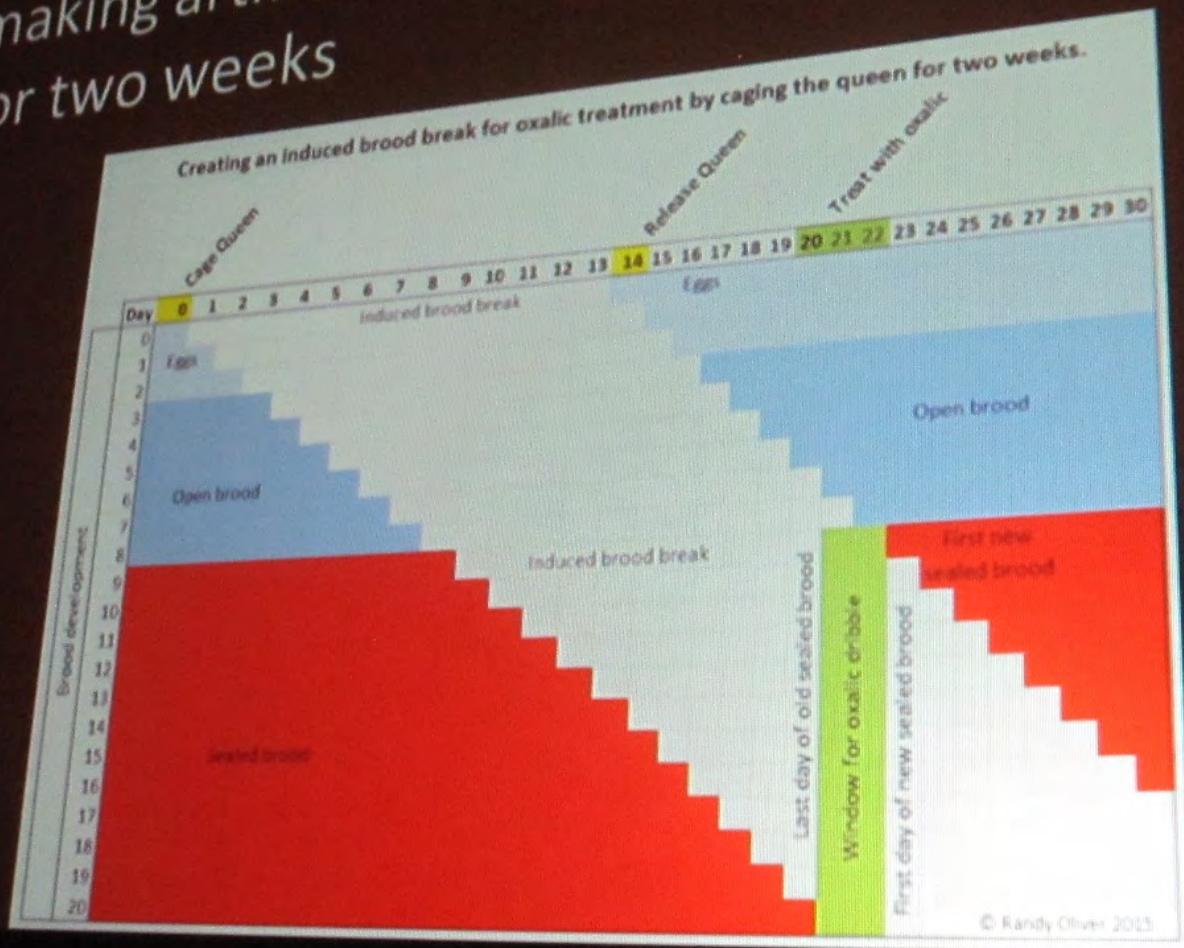
# Vaporizing Pros and Cons

- *Pros*
  - Can be used frequently (not harsh on bees)
  - No need to lift/move equipment
  - No mixing
- *Cons*
  - Dangerous Vapors
  - Requires special and expensive equipment
  - Longer treatment time
  - Only works on phoretic mites



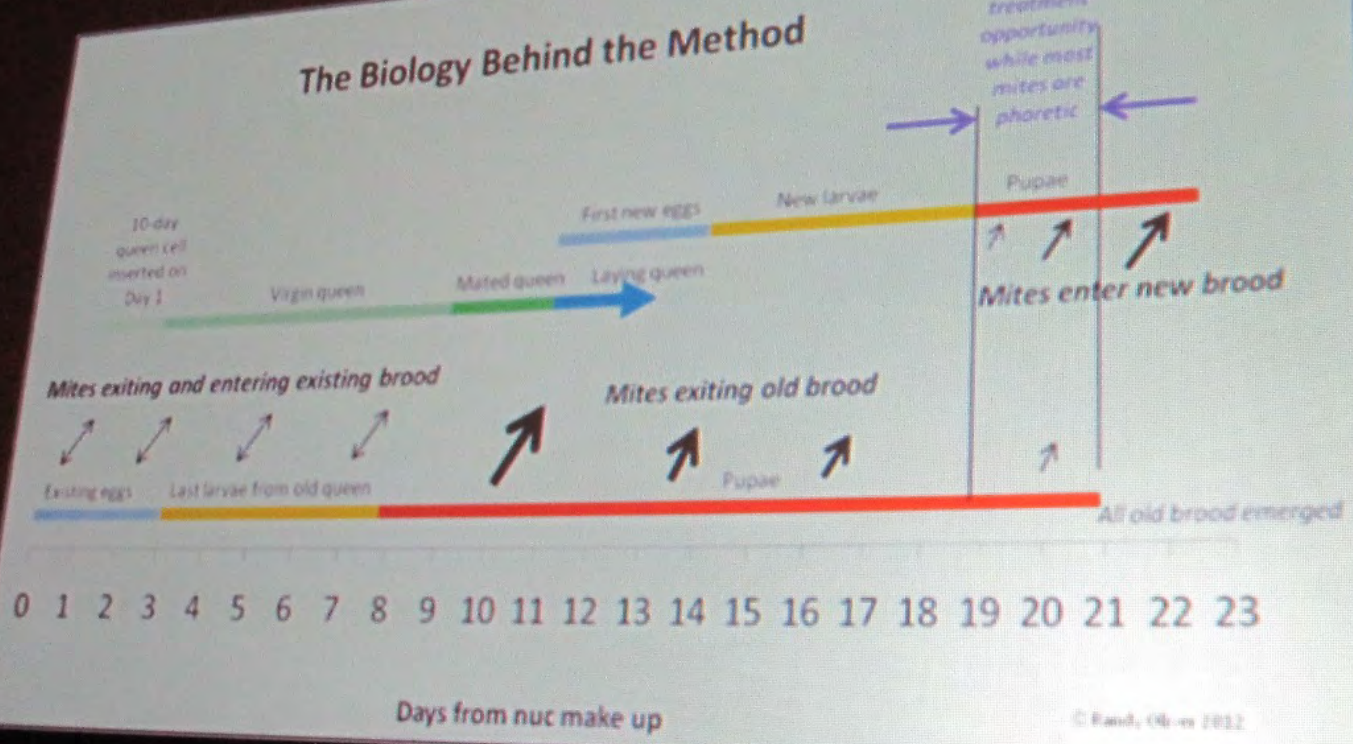
# Application

- Brood Breaks - Can induce a brood break by making artificial swarms or caging the queen for two weeks for two weeks



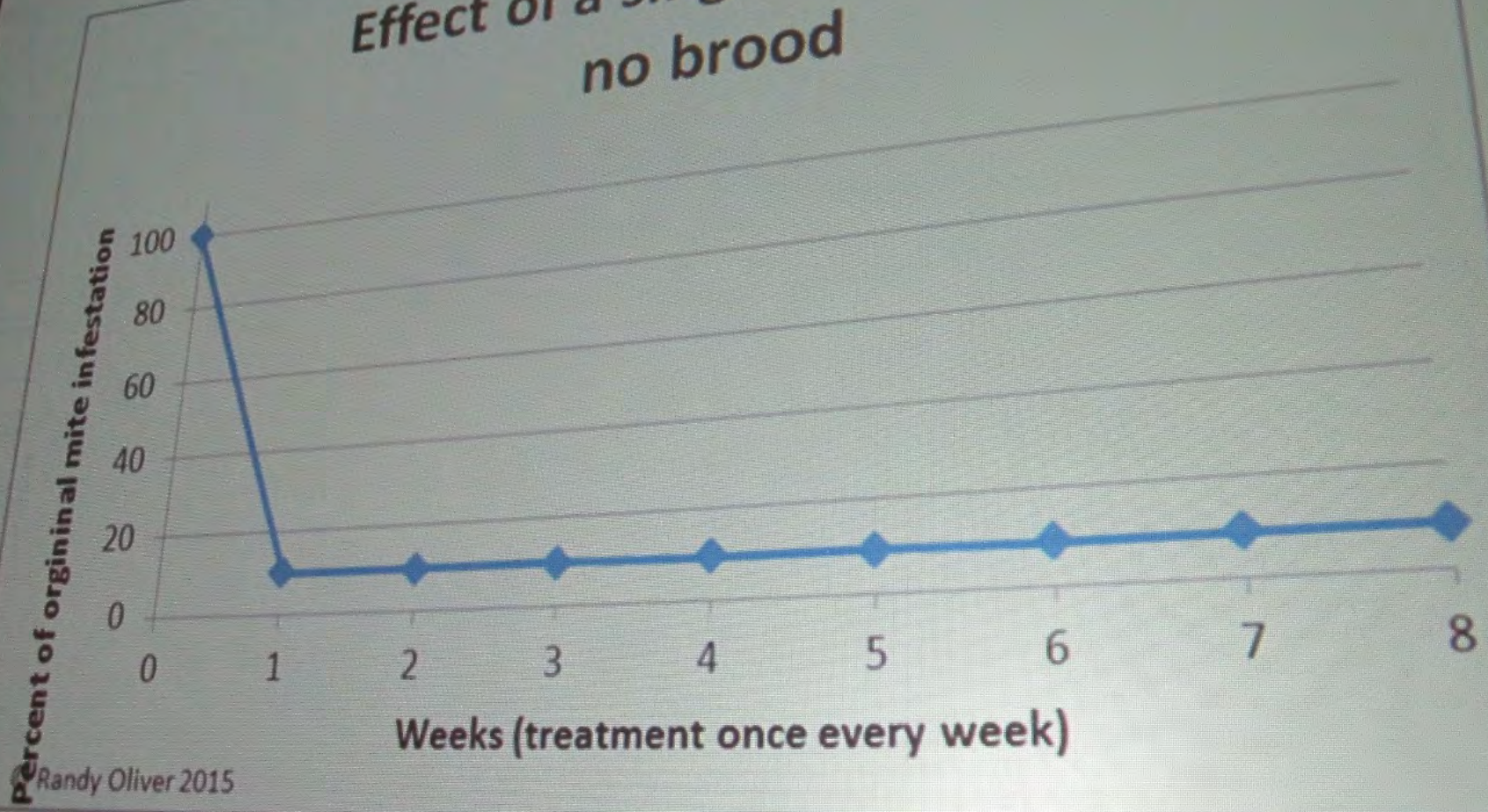
# Application

- Packages – after installation and before brood capping
- Brood-less Nucs – prior to capping of brood



Instructions: type values into for the two yellow cells and hit enter  
0 % A full broodnest with substantial  
Percent of full broodnest present  
there may be only 50% or less of a full broodnest present. Adjust this value to  
Expected weekly kill of the phoretic mites by the treatment  
90 % fil  
See r

## Effect of a single treatment, no brood



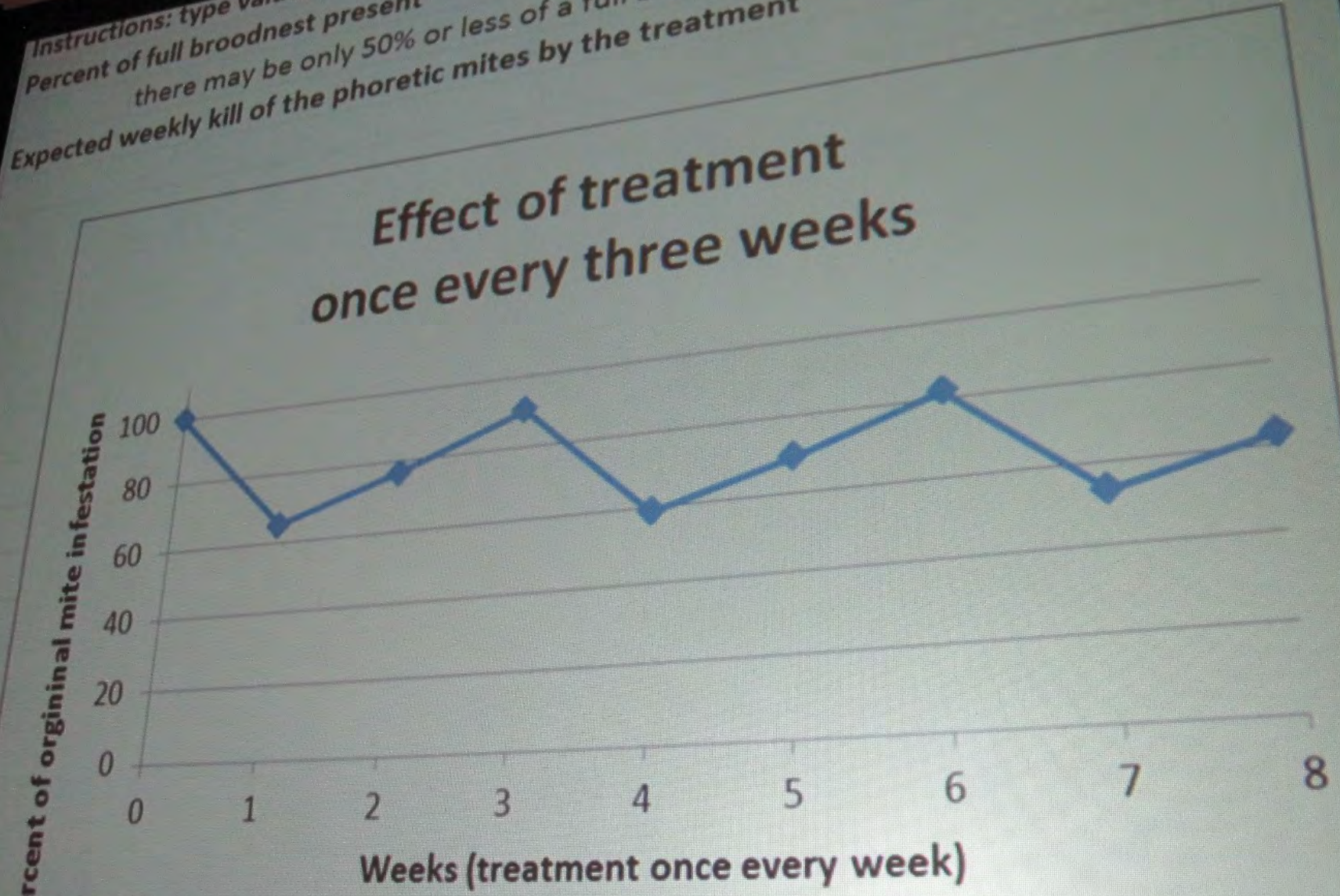
Instructions: type values into for the two yellow cells and hit enter  
Percent of full broodnest present  
Expected weekly kill of the phoretic mites by the treatment

100 %

90 %

See N

### Effect of treatment once every three weeks



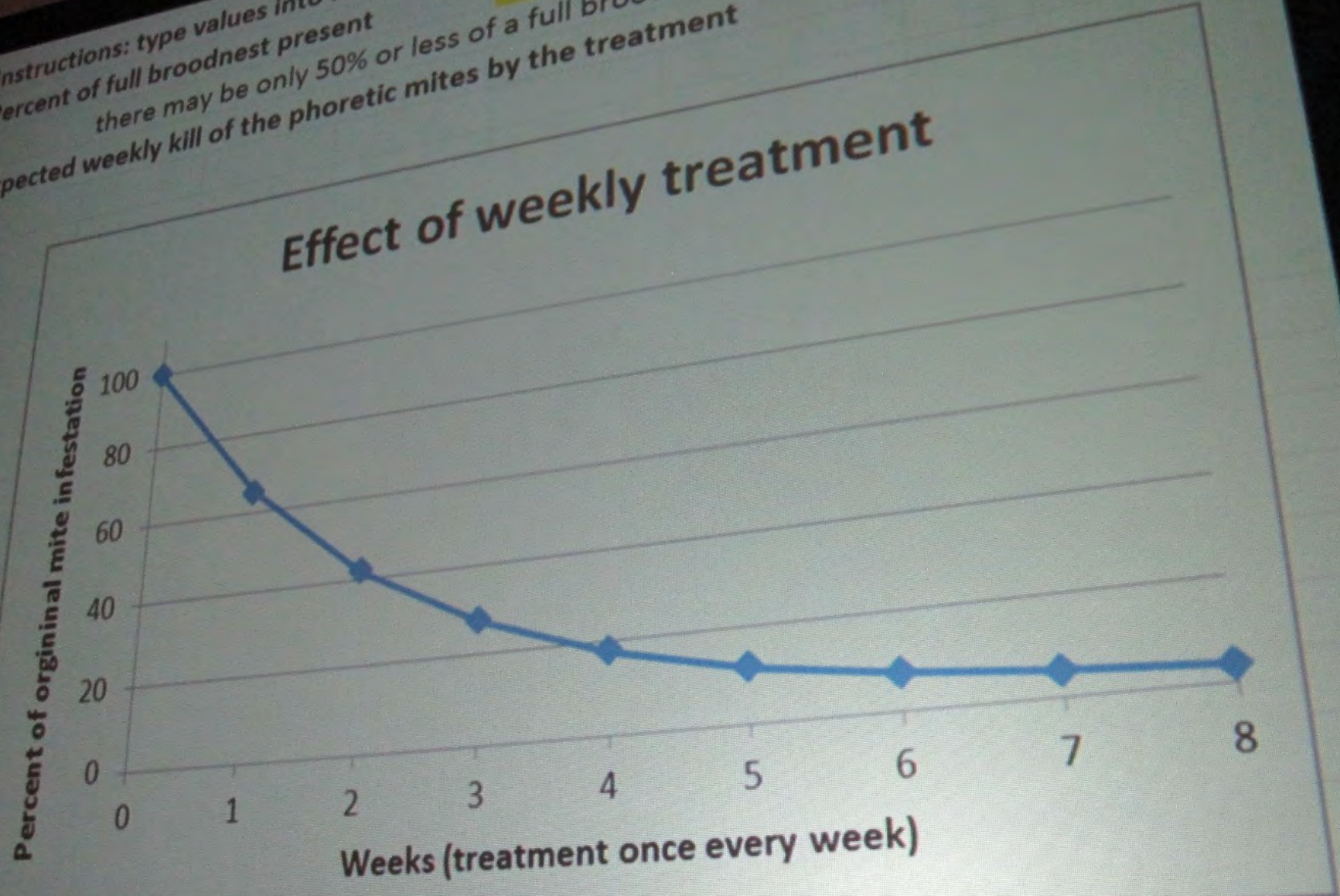
Instructions: type values into for the two yellow cells and hit enter  
Percent of full broodnest present  
Expected weekly kill of the phoretic mites by the treatment

100 %

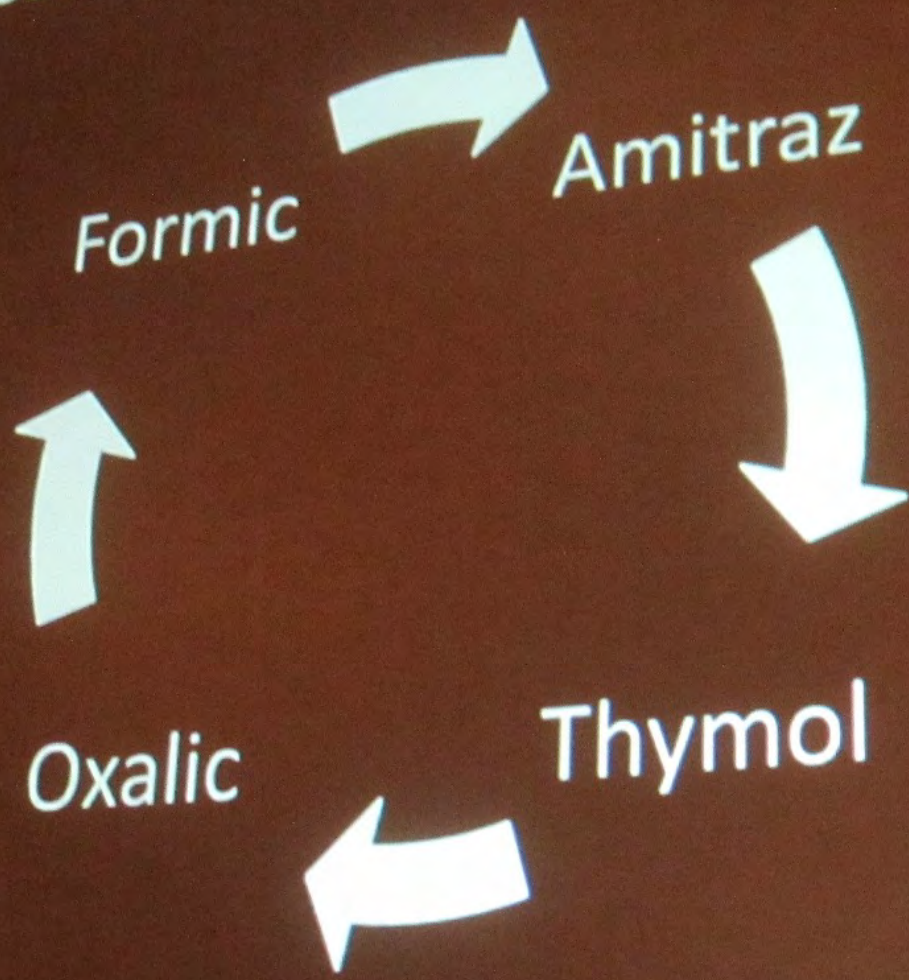
90 %

A full broodnest with substantial  
Adjust this value to yo  
See Not

## Effect of weekly treatment

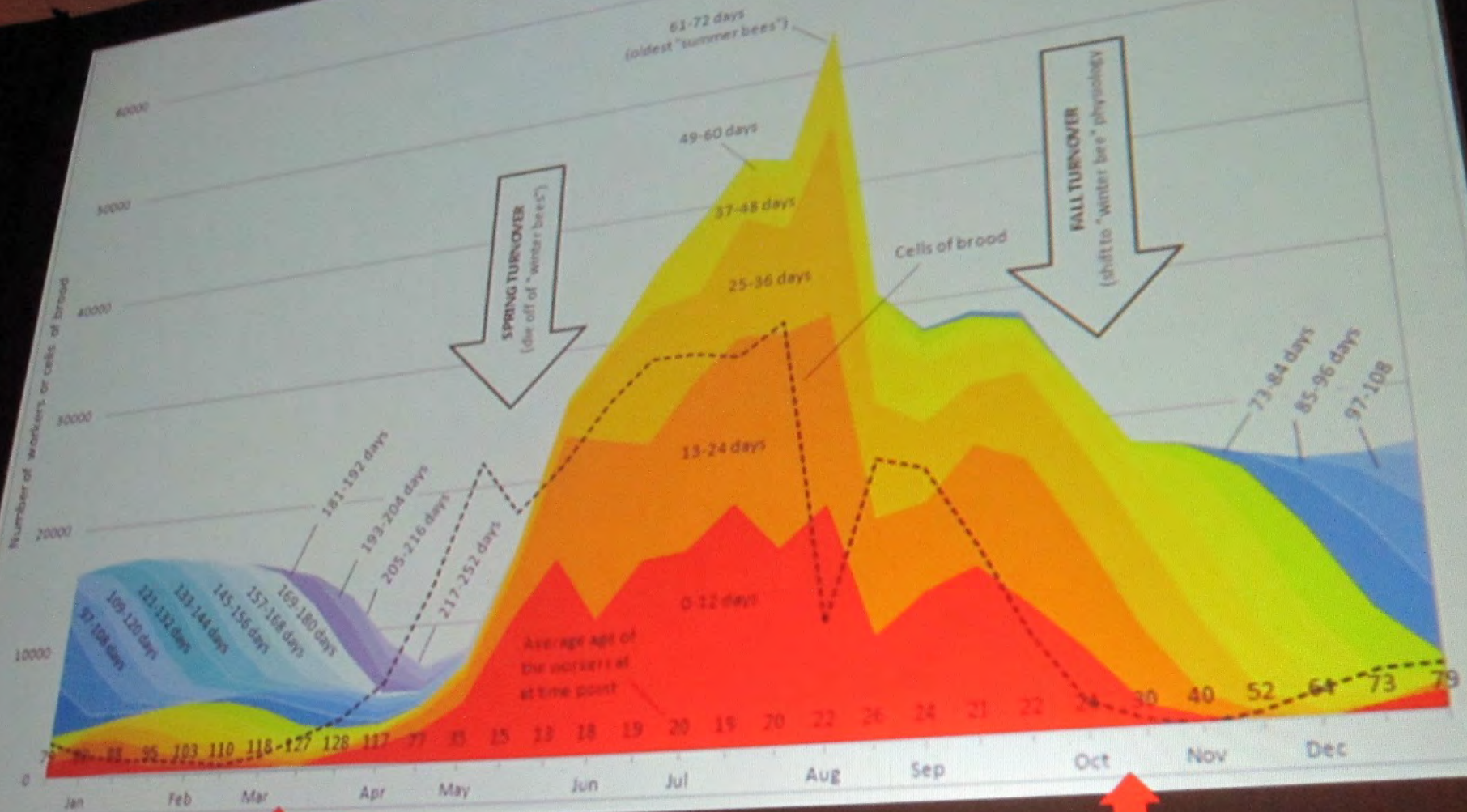


Practice some sort of rotation of treatments



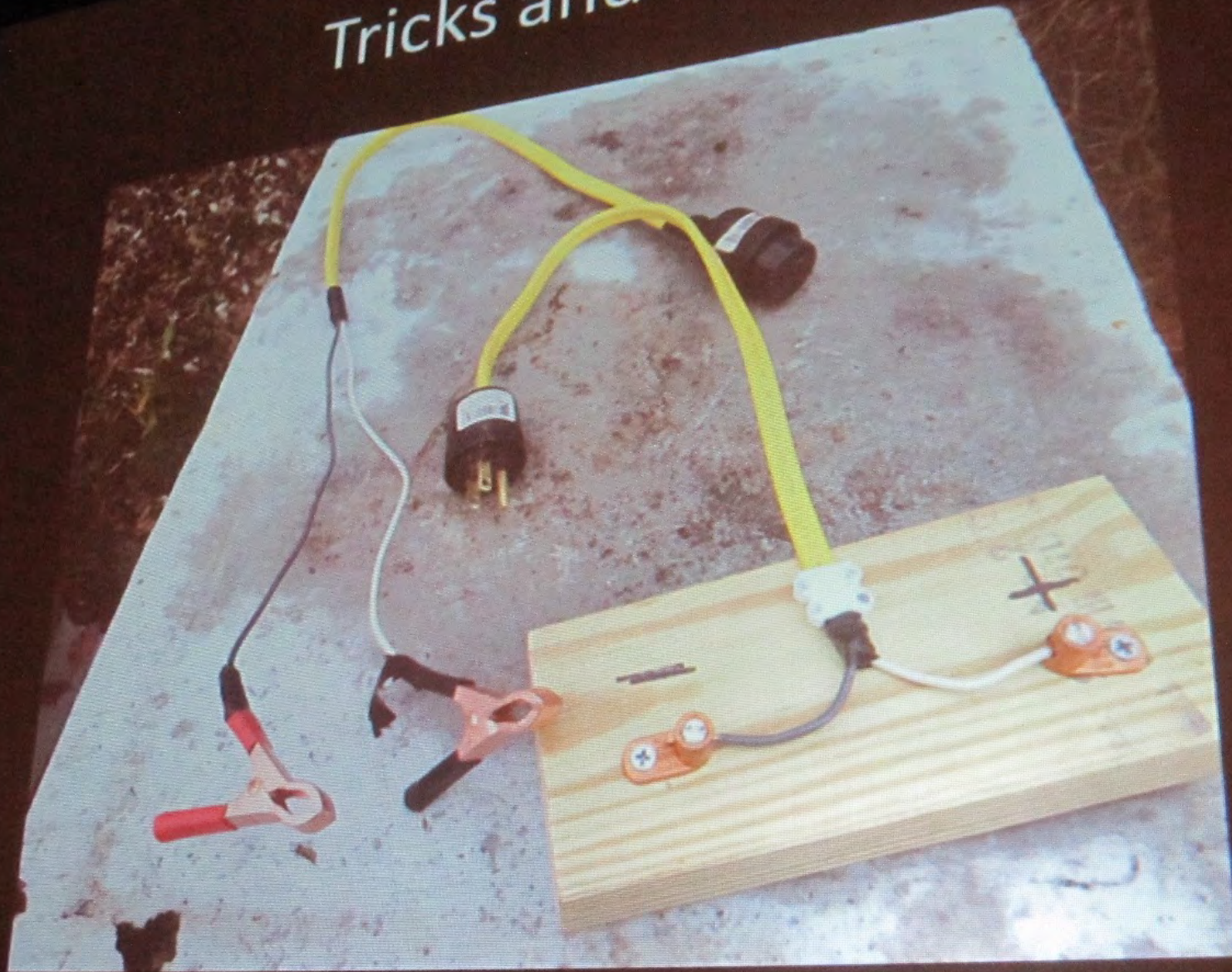
# Age Class Distribution of Workers Over the Year Manitoba, Shed Wintered

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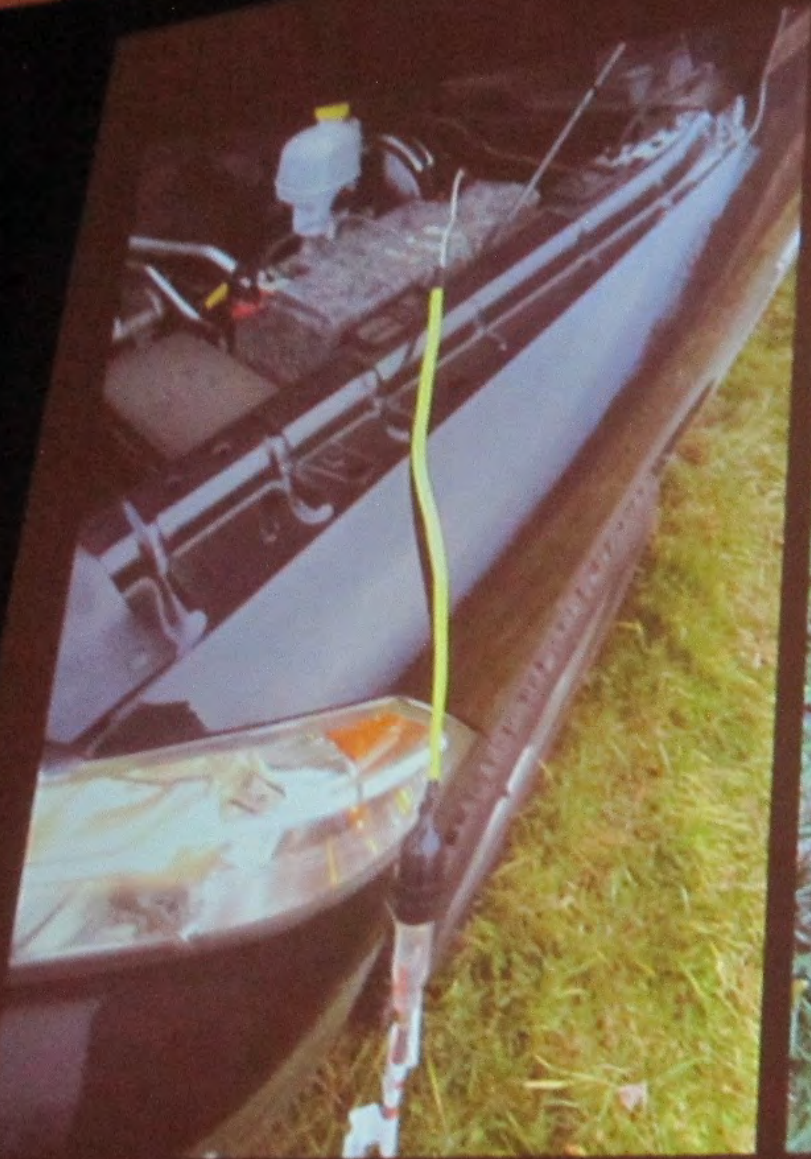


Seasonality Best Treatment Windows of Worker Demographics

# Tricks and Tools









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- Meat and Wine Supplies
- Gifts
- Monthly Specials
- Bargain Aisle - Discontinued and Scratch/Dent
- Featured Products
- New for 2015
- Cyber Monday

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Free Shipping does not apply to international orders, back ordered items shipped separately, glass jars, honey or syrup. LTL shipments will be sent out at no charge but any accessorial fees will be billed to customer's account. Other restrictions may apply.

Item #	Image	Description
727		Oxalic Acid Shp. Wt. 1 lb.
727K		Kit for Oxalic Acid Ship wt. 2 lbs. In Stock
727OAV		Varrocleaner Ship wt. 3 lbs. In Stock

**Thanks to Brushy Mountain for registering oxalic!**

# Acknowledgments

Randy Oliver

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<http://scientificbeekeeping.com/oxalic-acid-powerpoint-presentation/>