How to fill in the Priorities Survey

(Please select the top 5 in each category and give each a unique rank from 1 to 5; 1 = highest)	**2015 Ranking**
General IPM Issues	
Pesticide resistance	
Invasive/exotic species	
Weather/information delivery systems	
Cost reduction	
Pollinator conservation	
Organic production	
Pheromone technology	
OP/carbamate replacements	
Abandoned orchard impact	
IFP certification	
Groundwater monitoring	

How to fill in the Priorities Survey

(Please select the top 5 in each category and give each a unique rank from 1 to 5; 1 = highest)	**2015 Ranking**
General IPM Issues	
Pesticide resistance	
Invasive/exotic species	2
Weather/information delivery systems	4
Cost reduction	3
Pollinator conservation	
Organic production	
Pheromone technology	5
OP/carbamate replacements	1
Abandoned orchard impact	
IFP certification	
Groundwater monitoring	

How to fill in the Priorities Survey

(Please select the top 5 in each category and give each a unique rank from 1 to 5; 1 = highest)	**2015 Ranking**
General IPM Issues	
Pesticide resistance	
Invasive/exotic species	2
Weather/information delivery systems	4
Cost reduction	
Pollinator conservation	
Organic production	
Pheromone technology	5
OP/carbamate replacements	1
Abandoned orchard impact	
IFP certification	
Groundwater monitoring	
(write in) *How to get trap stickum out of your hair*	3

How not to fill in the Priorities Survey

(Please select the top 5 in each category and give each a unique rank from 1 to 5; 1 = highest)	**2015 Ranking**
General IPM Issues	
Pesticide resistance	1
Invasive/exotic species	1
Weather/information delivery systems	1
Cost reduction	1
Pollinator conservation	1
Organic production	1
Pheromone technology	1
OP/carbamate replacements	1
Abandoned orchard impact	1
IFP certification	1
Groundwater monitoring	1

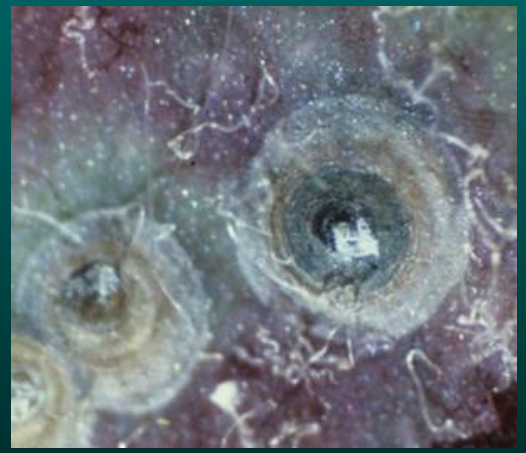
How not to fill in the Priorities Survey

(Please select the top 5 in each category and give each a unique rank from 1 to 5; 1 = highest)	**2015 Ranking**
General IPM Issues	
Pesticide resistance	2
Invasive/exotic species	2
Weather/information delivery systems	1
Cost reduction	3
Pollinator conservation	2
Organic production	1
Pheromone technology	1
OP/carbamate replacements	2
Abandoned orchard impact	4
IFP certification	4
Groundwater monitoring	5

How not to fill in the Priorities Survey

(Please select the top 5 in each category and give each a unique rank from 1 to 5; 1 = highest)	**2015 Ranking**
General IPM Issues	
Pesticide resistance	8
Invasive/exotic species	2
Weather/information delivery systems	4
Cost reduction	3
Pollinator conservation	7
Organic production	10
Pheromone technology	5
OP/carbamate replacements	1
Abandoned orchard impact	6
IFP certification	9
Groundwater monitoring	11

San Jose Scale – An Old Nemesis Returns



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Dept. of Entomology, NYSAES
Geneva, NY

San Jose Scale

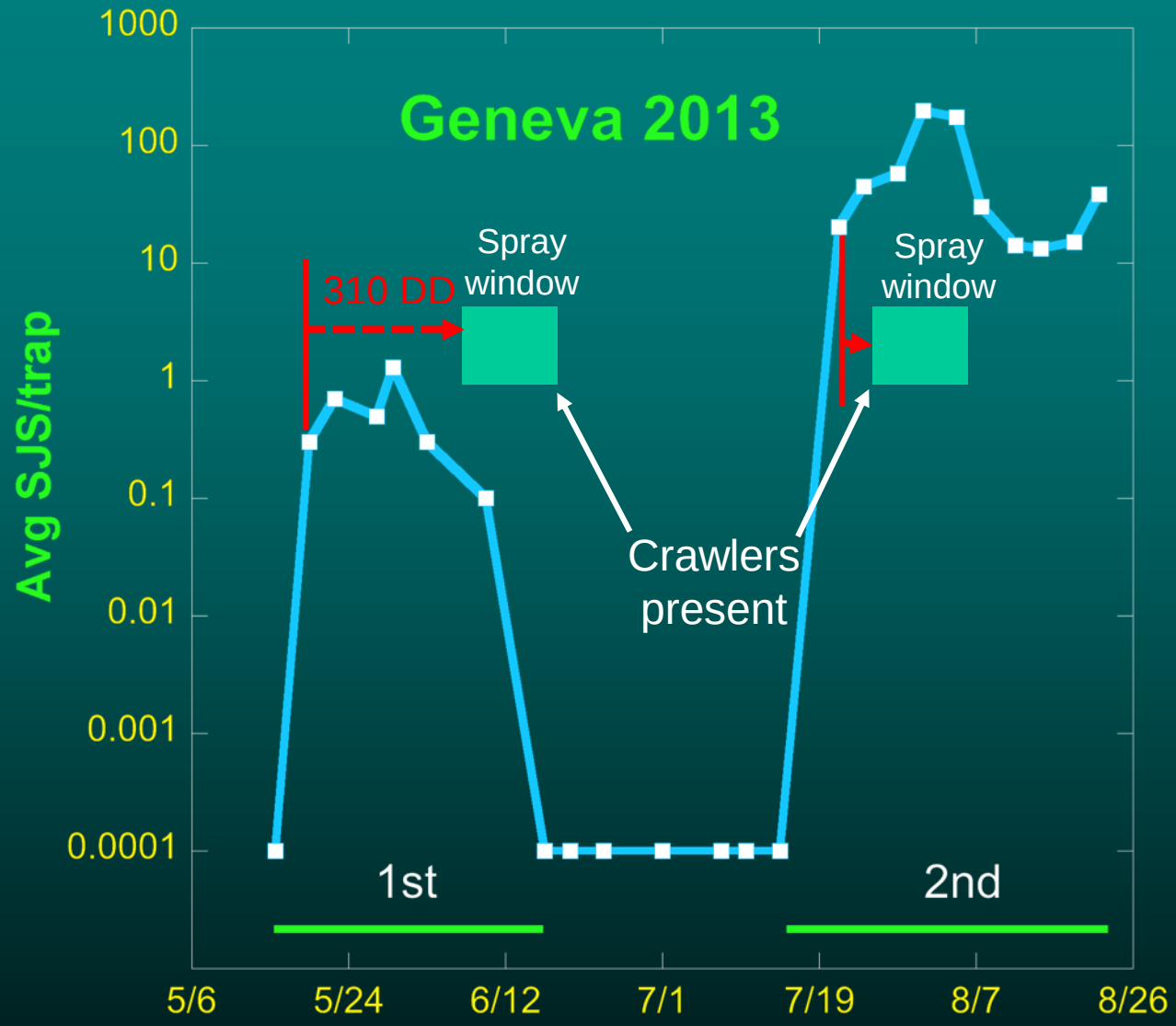
- Originally from China, introduced into the US (Cal.) on infested plant stock in 1890s
- Frequent sources of infestation: nursery plants, or wind-dispersed crawlers from non-fruit hosts
- Mainly colonizes wood tissue of branches and twigs; establishes on fruit surfaces when pops are high (mostly stem and calyx)
- When infestation originates from nursery, scales located from base of tree to growing point tips
- Damage caused by feeding by crawlers – suck plant sap: weakens plant, reduces fruit & shoot growth, desiccates foliage
- Infested areas of tree usually exhibit less foliage, smaller fruits; reddish “halo” surrounds point of scale attachment on fruit, under the skin – caused by plant reaction to toxin in saliva
- Smooth-skinned fruits (e.g. apples, pears) more susceptible than those with rough or velvety texture (peach)

San Jose Scale

Two generations per growing season in NY

- Overwinter as immatures under scale covers called “black caps”; mature to adults in spring; males emerge and mate around petal fall
- Crawlers emerge about mid-June and again in early August in WNY
- Can be timed by using DD accumulations:
  - 1st gen: 500 DD (base 50˚ F) from March 1, or 310 DD after 1st adult catch (~June 9-14)
  - 2nd gen: 1450 DD from March 1, or 400 DD after 1st adult catch (~Jul 29-Aug 4)
- Can monitor for crawlers using tape traps on scaffold branches

SJS Flight Timing

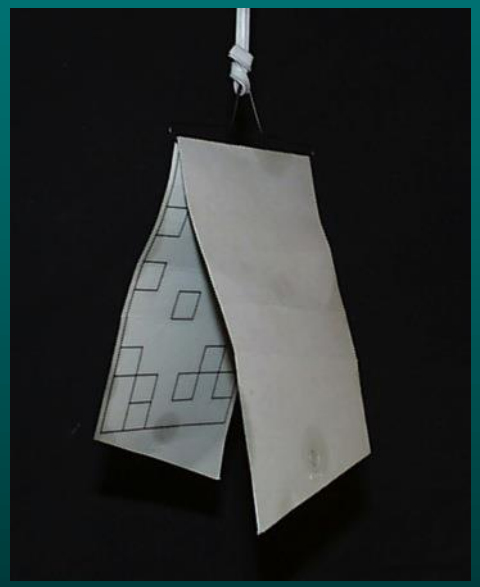


2013 – First catch of 1st generation: May 23; 2nd generation: July 22
2014 – First catch of 1st generation: May 27; 2nd generation: July 14

Monitoring

San Jose Scale

Pheromone trap
Developmental model
Physical trap



Biofix + DD model to predict 1st & peak crawler activity (e.g., 310 DD [base 50˚ F] after 1st adult catch for 1st gen); double-sided carpet tape trap on branch for 2nd generation crawlers

San Jose Scale Treatment Considerations

- Problem populations more common in larger, poorly pruned standard size trees with inadequate spray coverage
- Early season sprays help prevent SJS establishment
  - ½-Inch Green to Tight Cluster:
    - Oil (typical ERM spray)
    - Lorsban or Supracide
    - Esteem (IGR) plus oil
    - Centaur (IGR)

- Early season pruning to remove infested branches, open up canopy for better coverage
- Well-timed summer sprays at 1st and peak (7-10 days later) crawler activity: e.g., Admire, Assail, Esteem, Centaur, Imidan, Movento

San Jose Scale Insecticides

- AdmirePro (imidacloprid, IRAC Group 4A) – neonic; replaced Provado; moderate efficacy against crawlers
- Assail (acetamiprid, IRAC Group 4A) – neonic; moderate efficacy against crawlers
- Centaur (buprofezin, IRAC Group 16) – IGR; inhibits chitin synthesis, suppresses oviposition, reduces egg viability; good efficacy against all stages
- Esteem (pyriproxifen, IRAC Group 7C) – IGR; juvenile hormone analog: interferes with normal development, retards growth, causes sterility, ovicidal; good efficacy against all stages

San Jose Scale Insecticides, *cont.*

- Imidan (phosmet, IRAC Group 1B) – OP; contact plus stomach poison; moderate efficacy against crawlers
- Lorsban (chlorpyrifos, IRAC Group 1B) – OP; contact plus stomach poison; good efficacy against all stages
- Movento (spirotetramat, IRAC Group 23) – tetramic acid; 2-way systemic activity, moves to all areas of the plant, mode of action is lipid biosynthesis inhibitor (via ingestion), reduced fecundity and larval survival; good efficacy against all stages

[expected in future]

- Sivanto (Bayer – federally labeled; NY registration pending, IRAC Group 4D) – butenolide; nicotinic acetylcholine recepteor agonist
  - Pest spectrum: aphids, leafhoppers, scales, psylla
  - Activity via oral/ingestion; some contact activity
  - Rapid feeding cessation
  - Systemic in xylem from root uptake; translaminar from foliar application
  - Reduced risk to bees, predators & parasites

San Jose Scale Treatment Options

Crop	Admire	Assail	Centaur	Esteem	Imidan	Leverage	Lorsban	Movento
Apples								
Prebloom								
Summer								
Cherries								
Prebloom								
Summer								
Peaches								
Prebloom								
Summer								
Apricots								
Prebloom								
Summer								
Plums								
Prebloom								
Summer								

SJS Control Trial - 2009
(Mac & Cortland; Reissig/Combs)

Treatment	Rate/acre	% Infestation 17 Aug	% Infestation Harvest
Calypso+Movento PF	4 oz, 9 oz	9.7 a	29.7 a
Movento PF+2C	9 oz	7.0 a	1.7 a
Movento 2C	9 oz	13.0 a	25.3 a
Lorsban TC, Movento 4C	1.5 lb, 9 oz	5.0 a	11.0 a
Lorsban TC, Esteem 2/gen	1.5 lb, 4.5 oz	14.7 a	26.0 a
Untreated Check	–	18.7 a	26.3 a

- High pop pressure; Movento at PF + 2C numerically lowest (better than Lorsban at TC + Esteem 3C & 4C)

SJS Control Trial - 2010
(Mac & Cortland; Reissig/Combs)

Treatment	Rate/acre	% Infestation 4 Aug	% Infestation Harvest
Lorsban TC, Movento PF	1.5 lb, 9 oz	2.3 a	4.0 a
Lorsban TC, Movento 2C	1.5 lb, 9 oz	0.8 a	3.3 a
Lorsban TC, Movento 4C	1.5 lb, 9 oz	2.5 ab	5.5 a
Movento PF	9 oz	10.3 bc	8.5 a
Movento PF+2C	9 oz	5.8 ab	9.0 a
Lorsban TC, Esteem 2/gen	1.5 lb, 4.5 oz	1.5 a	3.5 a
Untreated Check	–	23.3 c	35.8 a

- Moderate pop pressure; Movento-only program had numerically higher damage, but Lorsban at TC *plus* Movento at either PF, 2C or 4C effective

SJS Control Trial – 2011

Empire, Cortland, Jonagold, Red Del; Reissig/Combs)

Treatment	Rate/acre	% Infestation 15 July	% Infestation Harvest
Movento PF	9 oz	0.3 c	2.0 b
Movento 1C	9 oz	0.7 bc	0.0 b
Movento 2C	9 oz	0.7 bc	9.3 ab
Untreated Check	–	11.0 a	17.3 ab

- Moderate pop pressure; single spray of Movento all farily effective, but PF or 1C with lower damage

SJS Control Trial – 2012

Empire, Cortland, Jonagold, Red Del; Reissig/Combs)

Treatment	Rate/acre	% Infestation 26 July	% Infestation Harvest
Movento PF	9 oz	0.0 b	42.7 ab
Movento PF+2C	6 oz	0.0 b	16.7 ab
Movento 1C+3C	6 oz	0.0 b	19.9 ab
Untreated Check	–	7.8 a	55.7 a

- Moderate pop pressure, increasing late; best results with Movento at PF with 2nd spray at 2C

SJS Control Trial – 2013

Empire, Cortland, Jonagold, Red Del; Reissig/Combs)

Treatment	Rate/acre	% Infestation 15 August	% Infestation Harvest
Lorsban+oil TC, Movento 2C	1 qt, 1 qt, 6 oz	3.7 bc	15.0 b
Sivanto+oil TC, Movento 2C	14 oz, 1 qt, 6 oz	0.3 c	13.7 b
Imidan PF, 2C-6C	3 lb	0.7 c	7.7 b
Untreated Check	–	25.3 a	77.7 a

- High pop pressure; lowest fruit infestation with Imidan (seasonal program), or TC treatments followed by Movento at 2C

[Not shown: 68-80% inf in other treatments (numbered products)]

SJS Control Trial - 2013
(McIntosh; Jentsch)

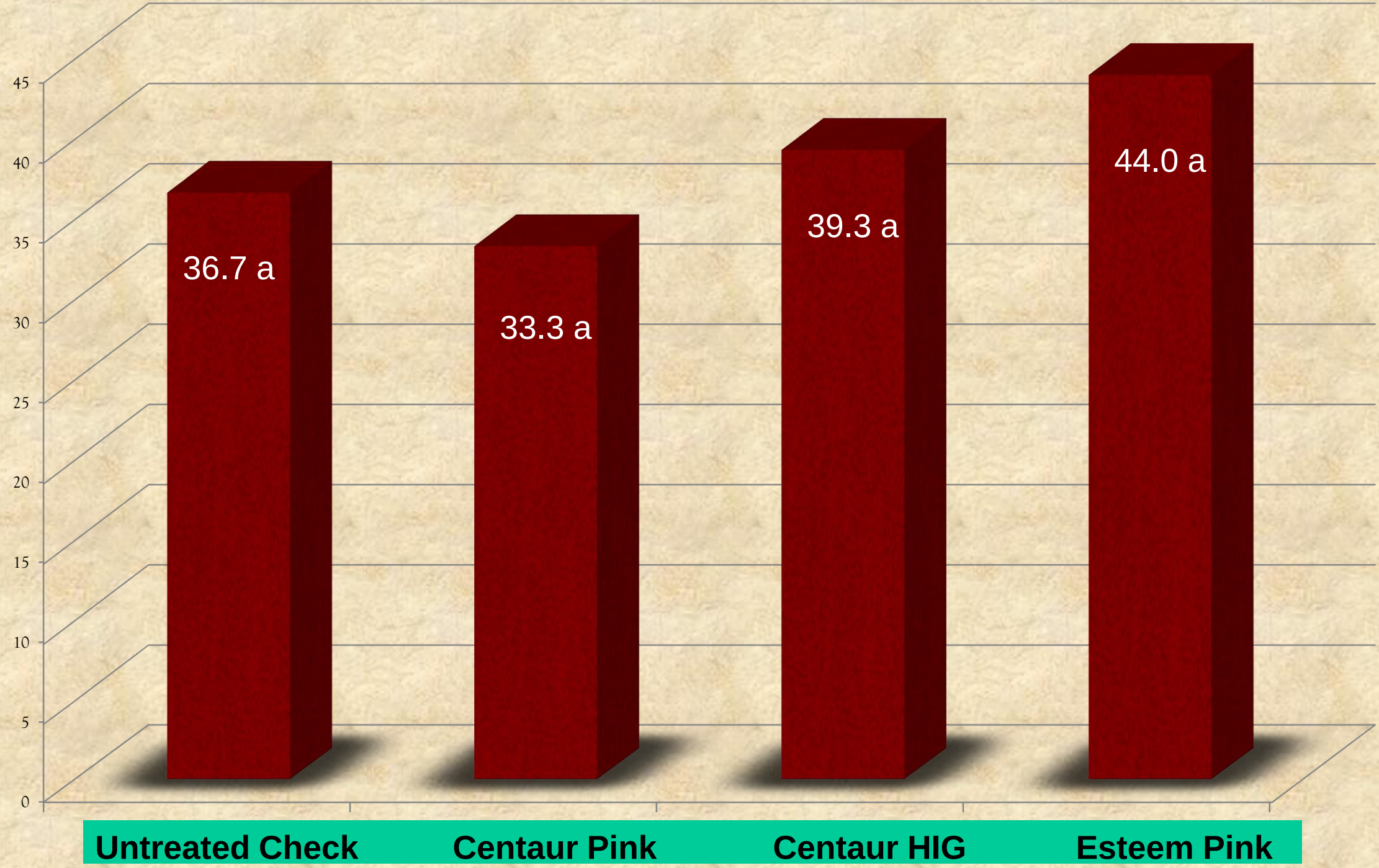
Treatment	Rate/acre	% Infestation 2 July	% Infestation Harvest
Movento PF	9 oz	1.8	10.3 a
Movento PF+2C	6 oz	2.5	0.8 a
Sivanto DD, Calypso PF+1C	14 oz, 6 oz	0.0	2.3 a
Centaur DD, Imidan PF-7C	46 oz, 3 lb	0.0	0.8 a
Lorsban TC, Imidan PF-7C	2 qt, 3 lb	4.2	0.5 a
Esteem TC, Imidan PF-7C	10 oz, 3 lb	2.3	3.5 a
Untreated Check	–	33.5	39.0 b

- Moderate pop pressure; Movento at PF+2C, Centaur or Lorsban pre-bloom followed by Imidan most effective

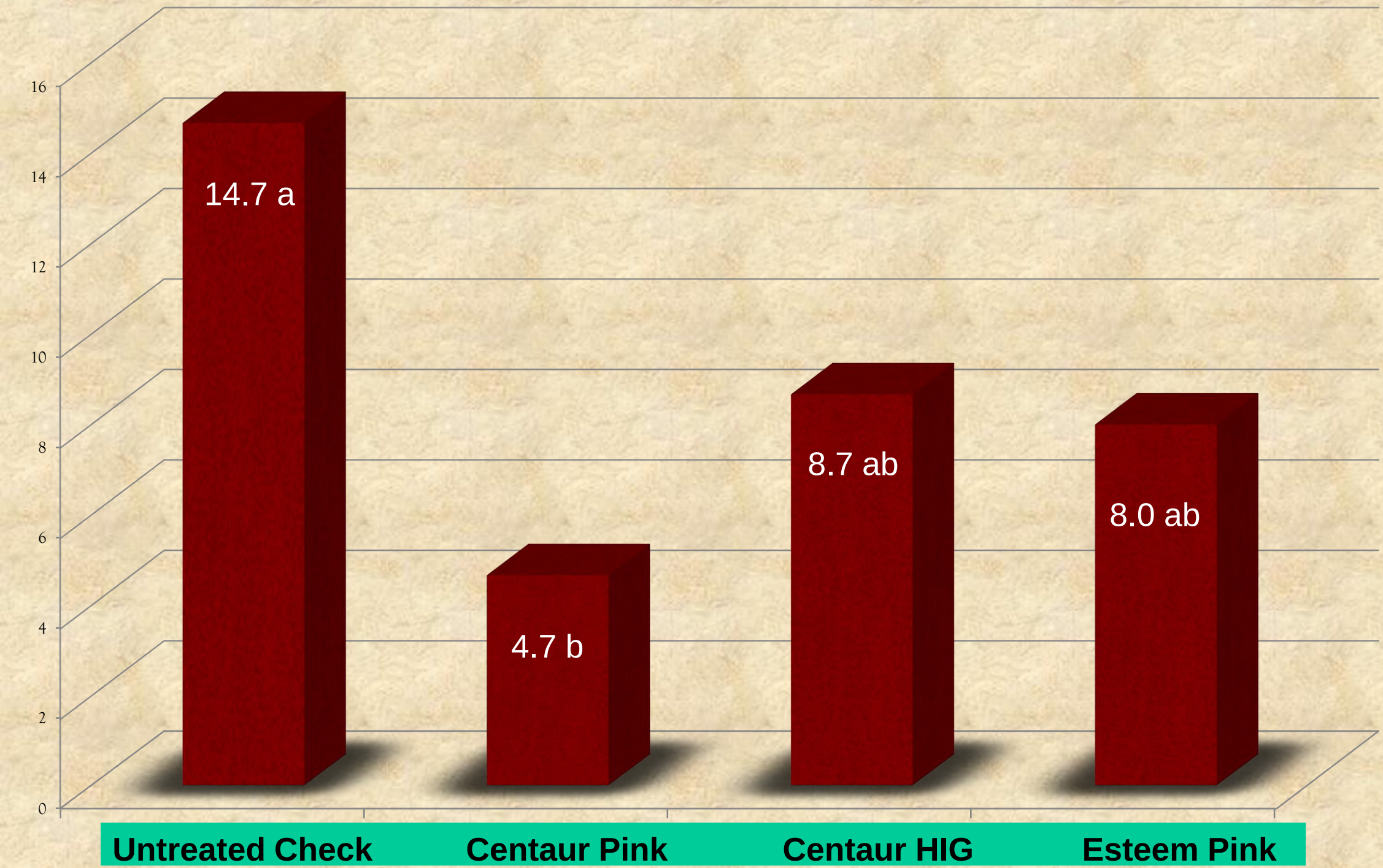
2014 Treatments

- Esteem 0.86 EC
  - Applied at ‘pink’ (13 May)
  - 16.0 oz/A
  - Active ingredient – Pyriproxyfen
- Centaur WDG
  - Applied at ‘1/2-inch green’ (24 Apr) and ‘pink’ (13 May)
  - Both treatments 34.5 oz/A
  - Active ingredient – Buprofezin
- Untreated Check

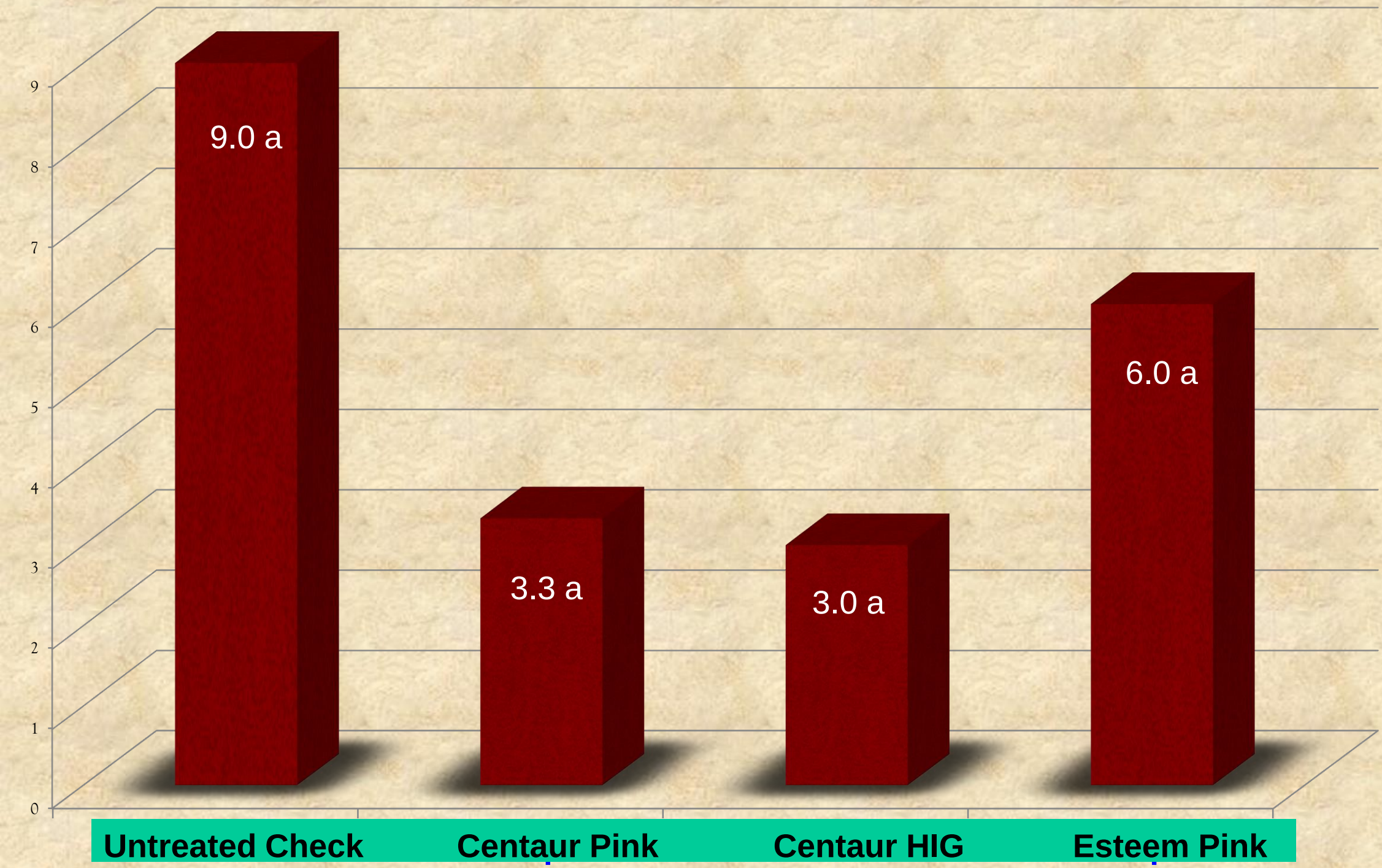
1st Yr Wood Pre-Application % SJS Overwintering Survival - 24 Apr



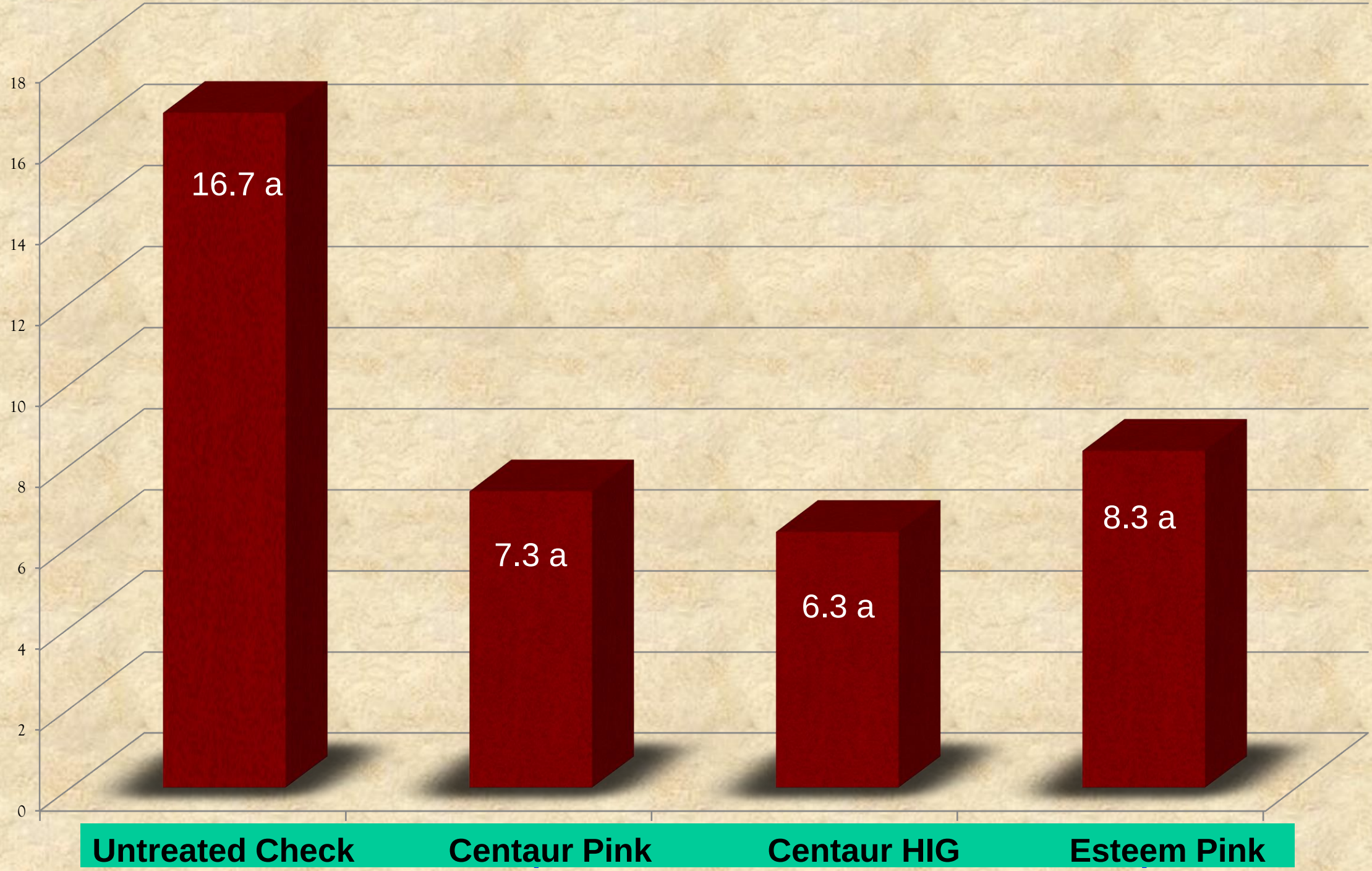
1st Yr Wood Post application % SJS Survival - 21 May



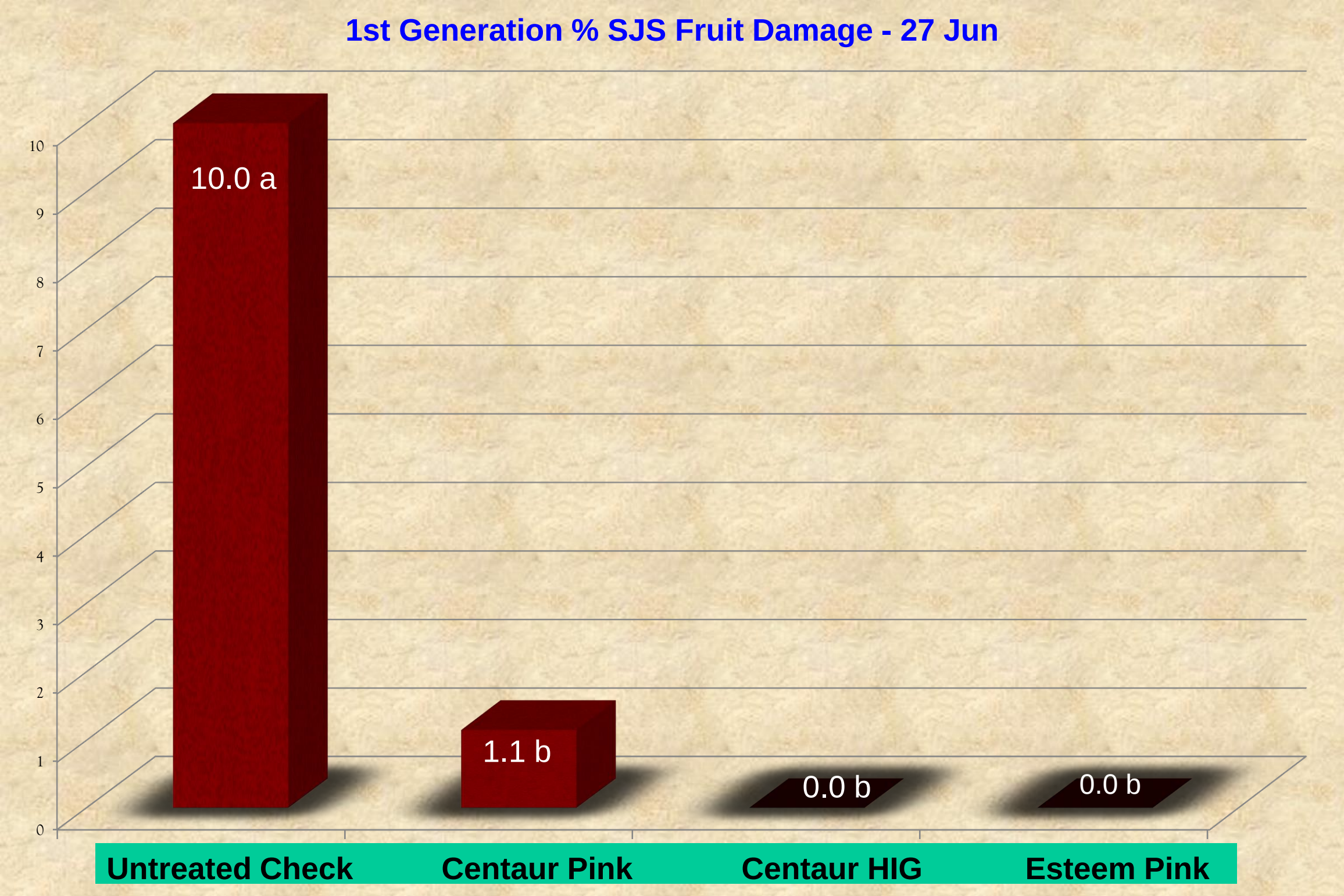
1st Yr Wood Post Application % SJS Survival - 29 May



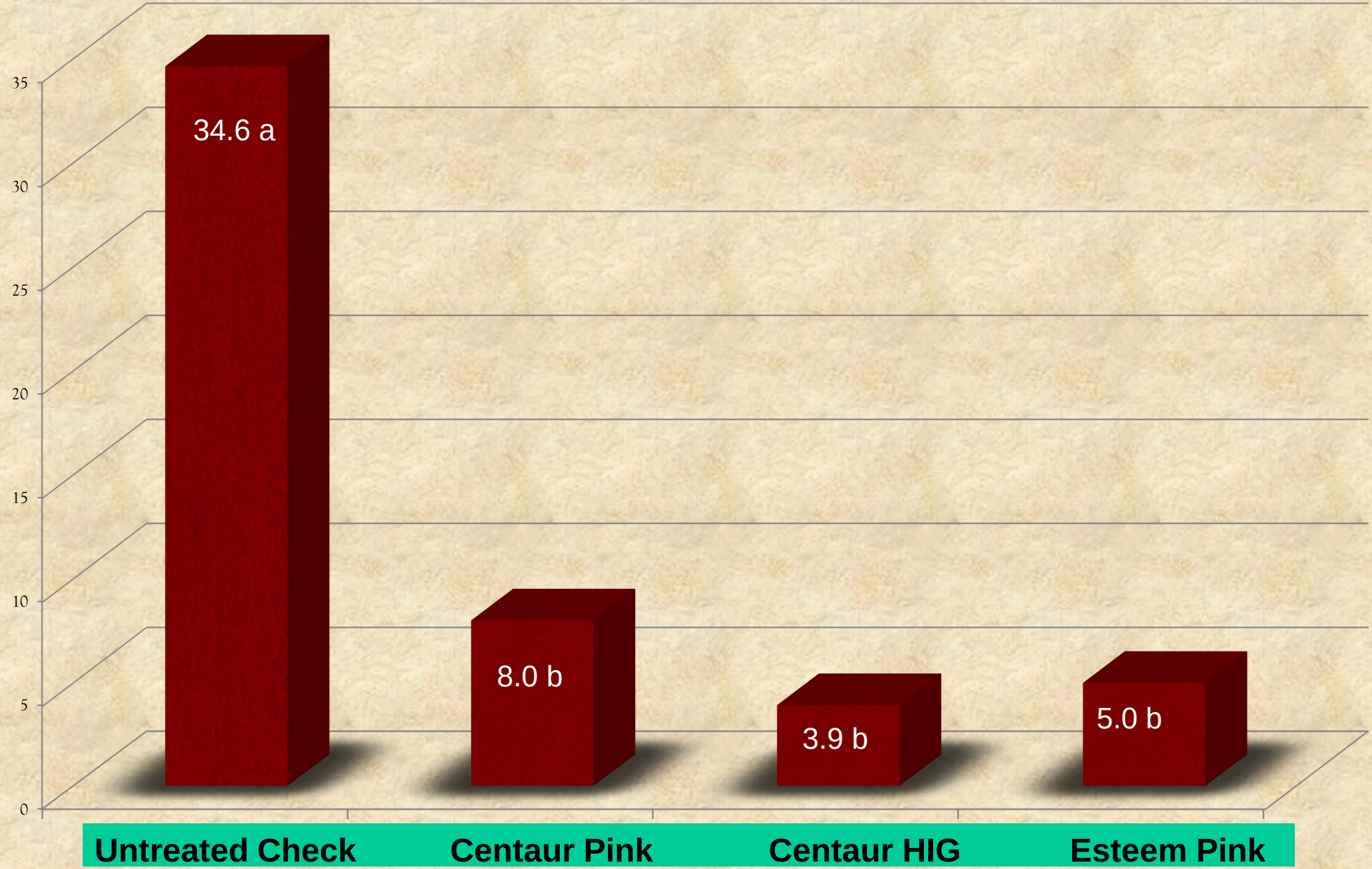
1st Yr Wood Post Application % SJS Survival - 4 Jun



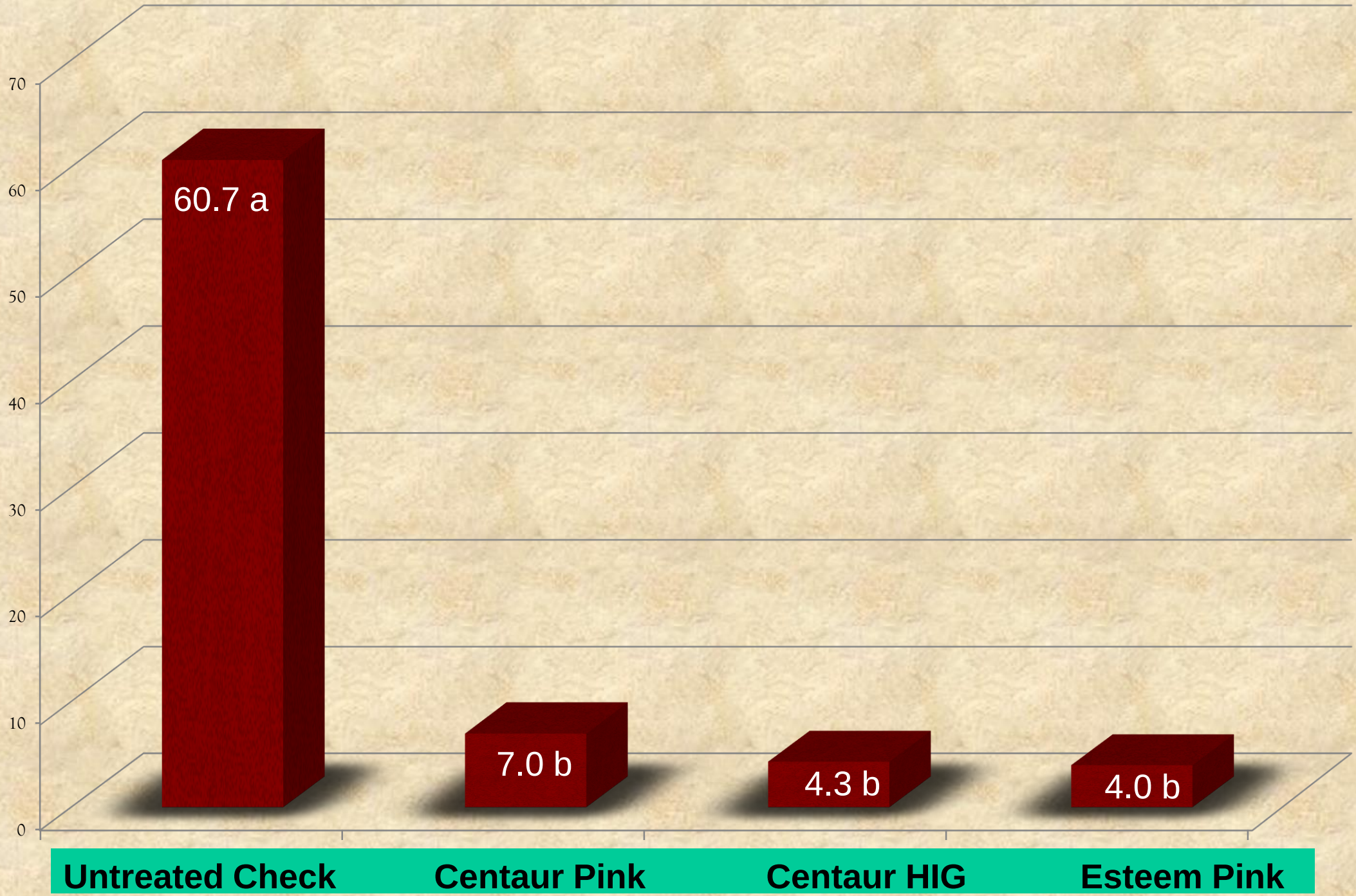
1st Generation % SJS Fruit Damage - 27 Jun



2nd Generation % SJS Fruit Damage - 29 Jul



% SJS Fruit Damage at Harvest



San Jose Scale Management

- Obtain clean plant stock from nursery
- Knowledge of potential host plants upwind of planting can inform you of the need for preventive measures
- In high infestation areas, pruning can reduce pest levels by removing potential sources of re-infestation
- Dormant oil sprays (1.5-2.0%), alone or in combination with insecticide, applied at high volume to completely wet the wood surfaces
- Complement with 2 summer sprays directed at crawlers (10-12 day interval)
  - Movento use generally most effective in 2 applications – Petal fall plus (1C or) 2C
- Use insecticides with different modes of action (IRAC groups) to avoid development of resistance
  - in 1914, entire US apple industry was threatened with extinction because of SJS resistance to lime sulfur – first documented case in US

White prunicola scale
Pseudaulacaspis prunicola

White Prunicola Scale

- Related to White Peach Scale (more common further south)
- Prunicola scale more common in temperate climates
  (NY/New England)
- Infestations characterized by numerous white scales =>
  "whitewashed" appearance
- Feeding reduces tree vigor, causes foliage to become sparse & yellow
- Heavy infestations can cause death of twigs, branches, entire tree
- Overwinters as adult female, deposits eggs in spring
- Management:
  - Oil during dormant period
  - follow up with insecticides (e.g., Movento, Centaur) against crawlers in mid-June through early July
  - (700-1150 DD base 50° F from March 1).