

# **Different Approaches to Tall Spindle Establishment in Apple**

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# What is Tall Spindle in Apple?

Closer spaced Vertical Axe

**Slender Spindle are short trees- earliest HD Systems in Europe. Require more pruning in Winter and Summer**



Vertical Axe system today; most widely adopted. Productive and less costly than SS.



Bevel cut  
needed  
to renew  
Branch  
(fruit 2-3 yrs)



Gala / Fl. 56 after 8 yrs

## Other systems and versions



Vertical Axis  
Could be called  
Tall Spindle



Super Slender Spindle  
Planted 1-1.5 ft apart

**Tall Spindle  
in South Tirole, Italy**





Dr. Terence Robinson, Hort Dept, Cornell-Geneva, NY  
Has been encouraging growers to consider the system

# Orchard Systems Publication

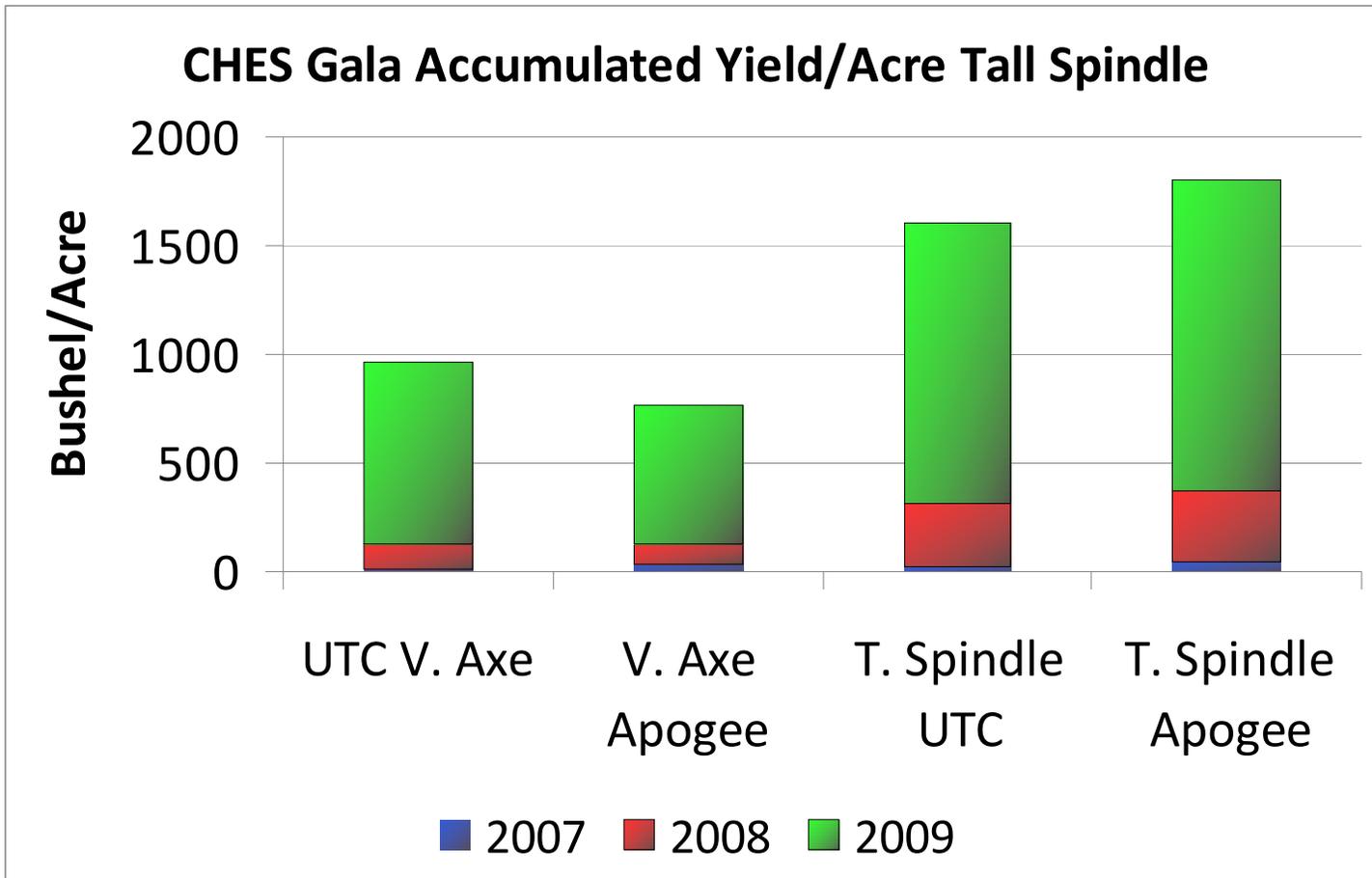
- (Robinson, T.L., A.M. DeMarree and S.A. Hoying. 2007. An economic comparison of five high density apple planting systems. Acta Hort. 732-481-490.)
- Economic analysis of 5 common orchard planting systems
  - Slender Pyramid/M.26 @ 340 trees/A \$7200 Est Cost / A
  - Vertical Axis/M.9 @ 623 trees/A
  - Slender Axis/M.9 @ 909 trees/A
  - Tall Spindle/M.9 @ 1341 trees/A
  - Super Slender Spindle @ 2179 trees/A) \$20,000 Est Cost / A
- All of the systems had a positive internal rate of return (IRR) and Net Present Value (NPV) after 20 years.
- **Profitability** as measured by NPV/A was greatest at the intermediate densities with the optimum density at 1052 trees/A
- **The earliest break-even year for NPV was year 12 for the Slender Axis, year 13 for the Tall Spindle systems, year 14 for the Super Spindle and the Vertical Axis systems and year 17 for the Slender Pyramid system.**
- Land cost, tree price and support system cost had a large impact on lifetime profits.
- **GREATEST IMPACT WAS FRUIT PRICE**
- Investment risk increased with increased investment costs, making the Super Spindle system riskier from an investment perspective.

Tall Spindle Trial at CHES Conducted by Phil Schwallier,  
Dist Extn Educator

Table 1. Trees Specs of 2006 Planting at CHES.

Variety	Rootstock	Tree Quality at Planting
<b>Empire</b>	<b>M.9 337</b>	<b>Whips</b>
Fuji	B.9	Feathered
Gala	RN 29	Feathered
Honeycrisp	B.9	Feathered
Jonagold	B.9	Feathered
Jonathan	B.9	Feathered
N. Spy	B.9	Whips

\* Phil Schwallier

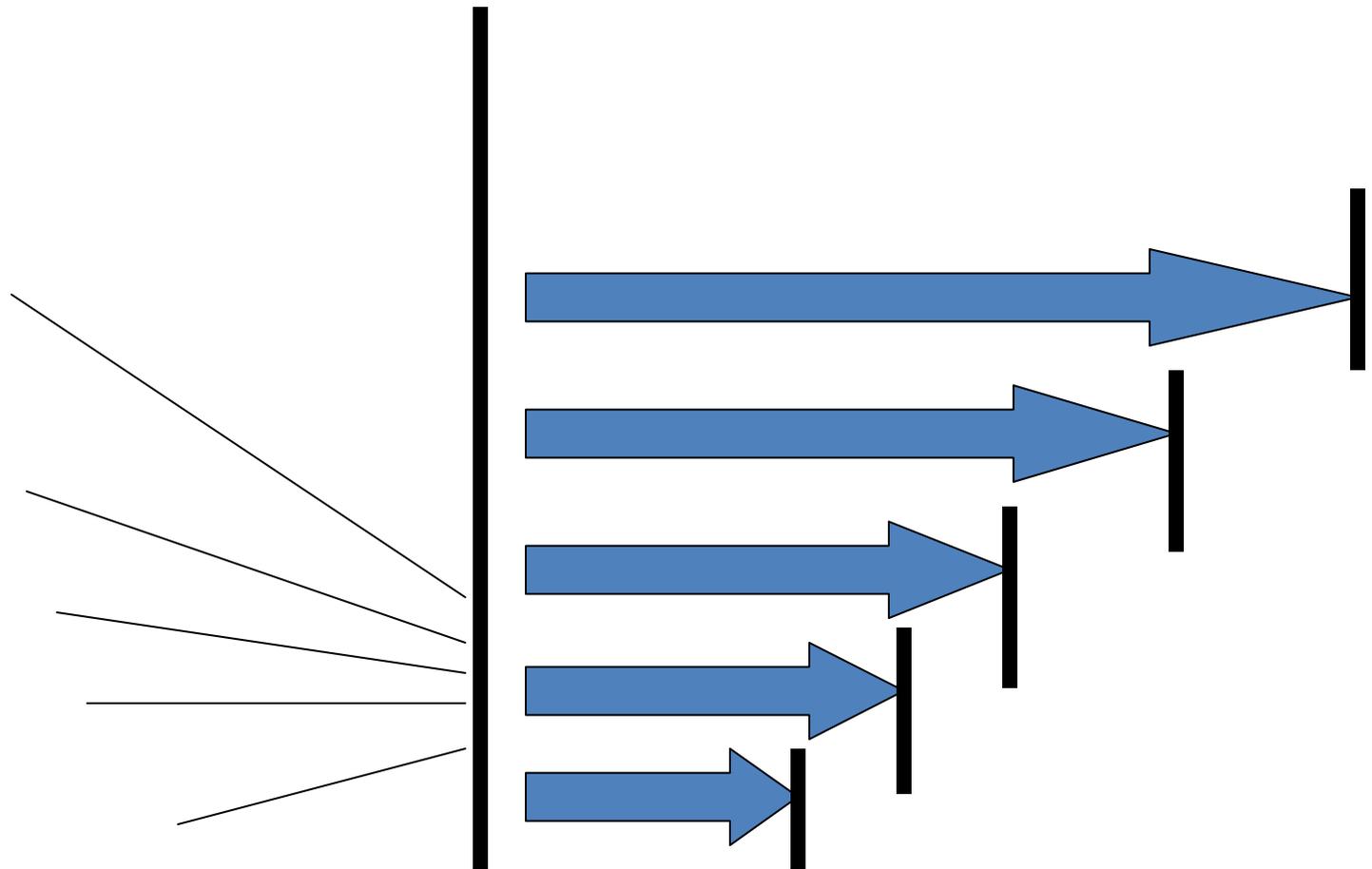


- 50% of trees treated with Apogee at King Bloom PF each year
- UTC = Untreated Control

# Key Components of the Tall Spindle

- 1) high planting densities,
- 2) dwarfing rootstocks,
- 3) highly feathered nursery trees,
- **4) minimal/no pruning at planting,**
- **5) bending feathers and branches below horizontal,**
- 6) no permanent scaffold branches and
- 7) limb renewal pruning to remove and renew branches as they get too large.

Spacing and canopy management dependent on branch angle and rootstock selection; **Closer spacing = more branch angle decline (bending)**



# Tying (webbing) branches, fundamentals of Slender Spindle Training





Occurs naturally with cropping



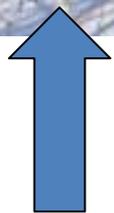
# Keep Only Weak Branches in the System

- Retaining fruiting branches
  - Keep branches that are:
    - 33% - 50% of leader size Tall Spindle and SSS
    - 50% of leader size Vertical Axe



# Varieties for Tall Spindle – rootstock is key

Northern Spy / B.9



Jon / B.9



## Recycling branches by making “Bevel Cuts”



**Bud forced on upper side  
Of branch stub (cut).**

**Bud forced from under side  
Of branch bevel cut.**

# Fruit Production in Early Years is Critical

- HRT 332 Tree Fruit Production and Management class taught in fall term at MSU
- Planting in fall class structure - Nov 2008 & 09 (Nov 15)
- Goldrush/Bud.9 – 2008 and Topaz/B.9 - 2009
- **CAUTION... this is not advised or recommended due to winter injury risk**
- **Need cold tolerant varieties and rootstocks to reduce risk and nurseries who will ship you trees**



Fall 2008 class  
Goldrush / B.9



Fall 2009 class  
Topaz / B.9  
SSS and TS

Pruned at  
Planting  
F 2008



Unpruned at  
Planting  
F 2008



Temps reached  
Below -15 deg F  
Winter 09



Crop at the  
end of the  
first growing  
season