

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

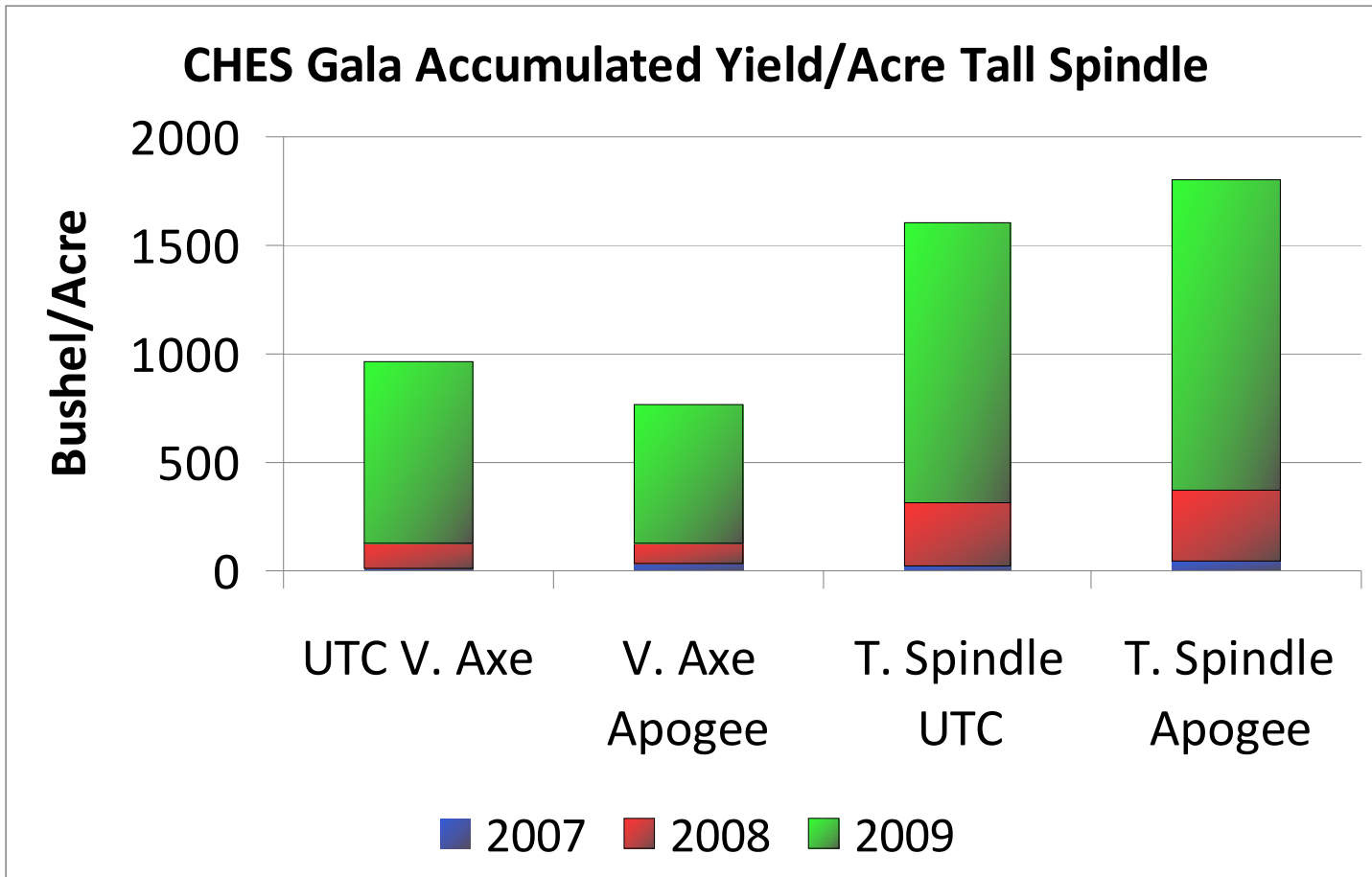
- (Robinson, T.L., A.M. DeMarree and S.A. Hoying. 2007. An economic comparison of five high density apple planting systems. Acta Hort. 732-481-490.)
- Economic analysis of 5 common orchard planting systems
 - Slender Pyramid/M.26 @ 340 trees/A \$7200 Est Cost / A
 - Vertical Axis/M.9 @ 623 trees/A
 - 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
Empire	M.9 337	Whips
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

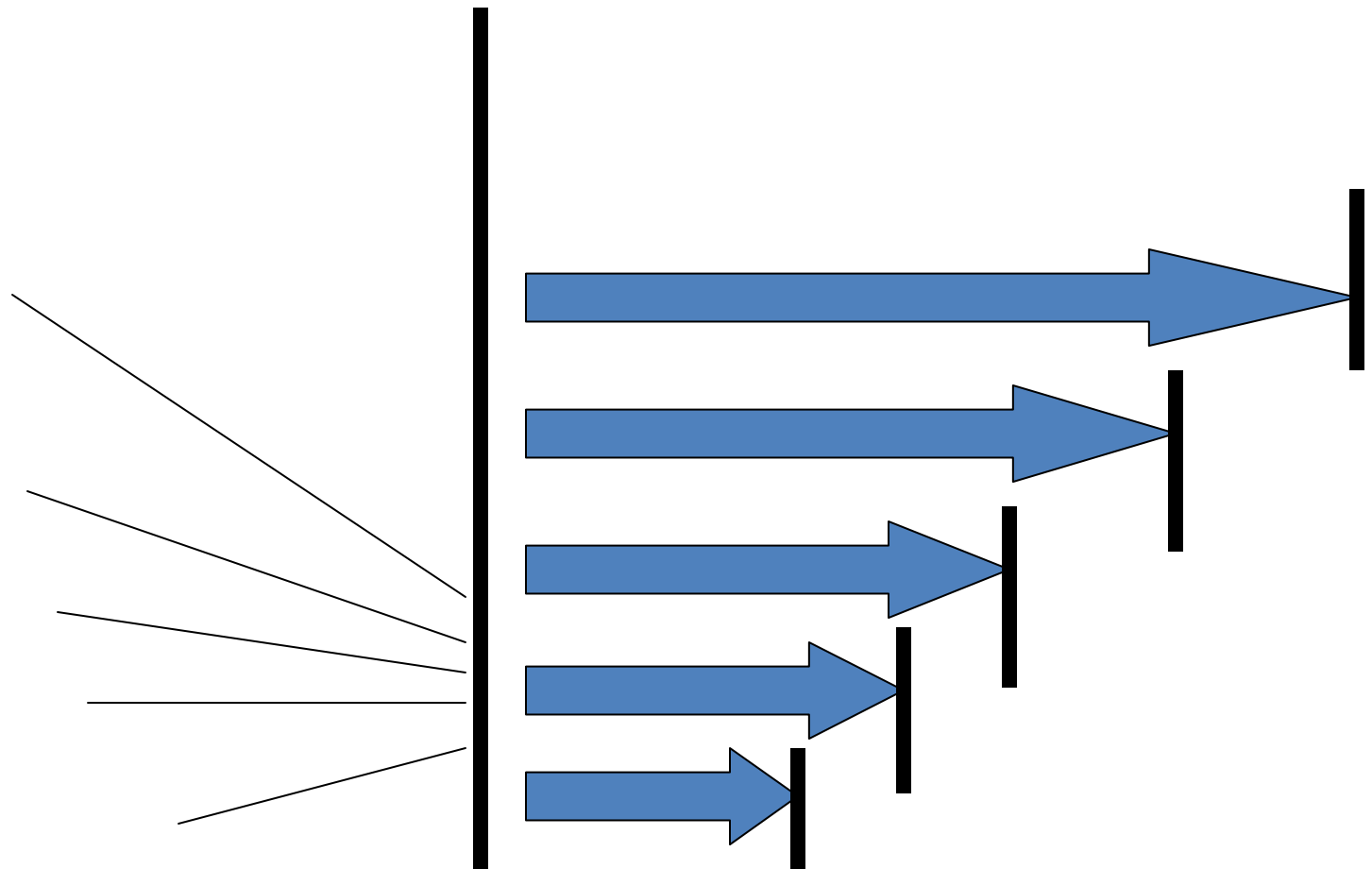


- 50% of trees treated with Apogee at King Bloom PF each year
- UTC = Untreated Control

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



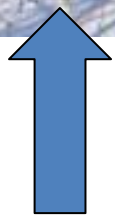
Keep Only Weak Branches in the System

- 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