Carl E. Whitcomb PhD

Forty Years + of Research and Accomplishments

Experiment #1 began in 1961 while an undergraduate student at Kansas State University working with Dr. Ray Keen. It involved the influence of dust layers on the root growth of lawn grasses in western Kansas. The intrigue of what would happen 'IF ?' and a vivid curiosity and imagination could not be suppressed. It is a very long way for the Kansas farm boy who built his own toys to match those in the Sears catalog and the youngster caught up in the intrigue of plants in field and pasture and the many things that they do. And later, the high school student who was told when inquiring about going to college "Laddie, I think you are wasting your time".

<u>The following are some of the 'firsts' and accomplishments to date</u>:

Created the connecting-pot technique for studying the relationships and interactions of roots of diverse species of plants (1966). A bareroot tree was placed in one container with four roots extending through holes in the sidewall and into additional containers. The root between the containers was wrapped with sphagnum moss and black plastic.
[Whitcomb, Carl E., Eliot Roberts and Roger Landers, 1969, A Connecting Pot Technique for Root Competition Investigations Between Woody Plants or Between Woody and Herbaceous Plants. Ecology, volume 50, pages 326-329]

First to observe that by girdling a tree root, downward flow of sugars is restricted just as occurs above ground (1967). (This critical observation led to the Knit Fabric In-Ground Container and 5-gallon Rootbuilder™ Grounder technology we have today.)
[Whitcomb, Carl. E. 1985. Innovations and the Nursery Industry. Journal of Environmental Horticulture, volume 3, pages 33-38]

First to discover that tree roots can be just as restrictive to grass roots as grass roots are to roots of young trees (1968). Tree-grass interactions are well known today.
[Whitcomb, Carl E. 1969, Competition Between Trees and Turfgrasses. Proceedings Southern Nursery Research Conf. volume 13, page 62.

Also, Whitcomb, Carl E. 1972. Influence of Tree root Competition on Growth Response of Four Cool Season Turfgrasses. Agronomy Journal, volume 64, pages 355-359. And, Whitcomb, Carl E. 1973. Competition Between Established Tree Roots and Newly Seeded Kentucky Bluegrass. Agronomy Journal, volume 65, pages 126-129]

First to discover that very low water solubility was the key to successful use of preemergent herbicides on container nursery stock (1969, with student Stanley Dean and Dr. Charles Conover). *[Dean, Stanley, Carl Whitcomb and C.A. Conover. 1970. Effects of Media and Container Type on Herbicidal Activity in Container Grown Woody Ornamentals. Proc. Fla. State Hort. Society, volume 83, pages 502-507]*

First to create containers with sidewall openings in an attempt to improve aeration of the growth medium and air-root-prune. (But it did not work since we now know that air is drawn into the mix from the top of the container, not the sides and that openings in the sidewall must be strategically placed to accomplish air-root-pruning. However, this container was copied and manufactured by Nursery Supplies for many years.) *[Whitcomb, Carl E., 1971, Effects of Container Sidewall Porosity, Growth Media and Presence or Absence of Micronutrient Fertilizer on Root and Top Growth of Carissa grandiflora. Proc. Southern Nursery Research Conf. volume 17, page 13]*

First to propagate cuttings using antitranspirant coatings over the leaves instead of mist (1969-1971, with students Jerry Southwell, Worth Axier, Lonnie Davis and Gerald Swan). *[Davis, Lonnie T, and Carl E. Whitcomb, 1970, Asexual Propagation Without Mist. Proceedings of the Southern Nursery Research Conf. volume 15, page 45. Also, J.S. Southwell, H.W. Axier, G.W. Swan and Carl E. Whitcomb, 1971, Propagation of Semi-Hardwood Cuttings Using Antitranspirants and No Mist. Proc. Southern Nursery Research Conf. volume 17, pages 64-65]*

First to discover that early root pruning of the taproot soon after seed germination could stimulate desirable root branching (with students, Jon Rackley, David Stoner, Randy Davis and others, 1969-1974). [*Davis, Randy E. and Carl E. Whitcomb. 1975. Effects of Propagation Container Size on development of High Quality Tree Seedlings. Proc. Int. Plant Propagators Soc. volume 25, pages 448-453]*

**First to accomplish air-root-pruning of tree seedlings by using bottomless quart milk cartons on wire benches (with graduate students, Dave Stoner, Jon Rackley, Richard Sanger, Robert Burns, Craig Chambers, Robert Hathaway and others, 1968-1976). [*Hathaway, Robert D. and Carl E. Whitcomb. 1977. Propagation of Quercus Seedlings in Bottomless Containers with Osmocote. Journal of Arboriculture, volume 3, pages 208-212]*

First determine that broadleaf trees and shrubs are much more effective at reducing noise transfer in the landscape than conifers. 1972, with student Jacob Stowers. *[Whitcomb, Carl E. and Jacob Stowers, 1973, Sound Abatement With Hedges, HortScience, volume 8, pages 128-129]*

First to direct stick cuttings in small containers and observe greater uniformity of rooting and ease of transplanting compared to sticking cuttings in large beds or bulk flats (1969, with students Jon Rackley, Roger Bean and Mark Bisher). Direct sticking of cuttings in individual containers is almost universally used today. [*Whitcomb, Carl E., Jon G. Rackley and Roger Bean. 1975. The Effects of Multiple Liners per Container on Growth and Visual Grade of Woody Ornamental Plants. Nursery Research Journal, volume 3, pages 1-13]*

First to show that the reason various northern conifers (Taxus, white pine, Mugo pine, blue spruce and white fir) grew poorly in Florida and the Deep South was due to photoperiod, 1969-1970. *[Whitcomb, Carl E. and J.N. Joiner, 1970, Growth of Northern Conifers in Florida. The Florida Nurseryman, volume 15, pages 7 and 36. Also, Whitcomb, Carl E. and J.N. Joiner, 1971, Effects of Day length, Light Intensity and Fertilizer Rates on Growth of Six species of Northern Conifers. Proceedings Southern Nursery Research Conference, volume 17, page 18]*

First to study the incorporation of slow release fertilizers in the rooting medium for cuttings stuck in small individual containers (1970-71, with student Mark Bisher, later in more detail with graduate students Jim Ward and Mike Carney). *[Ward, James, D. and Carl E. Whitcomb. 1979. Nutrition of Japanese Holly During Propagation and Production. Journal of the American Society for Horticultural Science, volume 104, pages 523-526.*

Also, Carney, Michael and Carl E. Whitcomb, 1983, Effects of 2 Slow-Release Fertilizers on the Propagation and Subsequent Growth of 3 Woody Plants. Journal of Environmental Horticulture, volume 1, pages 55-58]

**First to narrow the water solubility of preemergent herbicides suitable for use on container nursery stock to less than one part per million (1969-1974, with students Joel Butler, Jon Rackley, Paul Klinger, Ann Moles and Philip Perryman*). [Klinger, Paul, and Carl E. Whitcomb, 1971, Movement of Herbicides in Containers. Proceedings of Southern Nursery Research Report, volume 15, pages 5-6. Also, Whitcomb, Carl E., and Jon Rackley. 1974 Effects of Multiple Applications of Treflan on Weed Control and Growth Response of Four Woody Ornamentals in Containers. Nursery Research Journal, volume 1, pages 1-9. Also. Whitcomb, Carl E. and Joel F. Butler. 1975. Performance of Trifluralin, Nitralin and Oryzalin in Nursery Containers. Journal of the American Society for Horticultural Science, volume 100, pages 225-229. Also. Whitcomb, Carl E. and Philip E. Perryman. 1975. Effects of Irrigation on the Movement of Treflan and Lasso in Containers. Nursery Research Journal, volume 2, pages 1-10. Also. Moles, Ann and Carl E. Whitcomb. 1978. Movement of Ronstar in Containers as Influenced by the Growth Media. Nursery Research Journal, volume 5, pages 1-8]*

First to use ground pine bark as a major component in a container growth medium (1970, with student David Stoner). [*Whitcomb, Carl E., 1970, Nursery Problems: Solutions Through Research. The Florida Nurseryman, volume 16, pages 6-7]*

Created discs of plastic and various fabrics to exclude light from the surface of container growth media in order to control weeds (1970). [*Whitcomb, Carl E., 1970, Nursery Problems: Solutions Through Research. The Florida Nurseryman, volume 16, pages 6-7]*

Coated or impregnated mulches, fabrics or other materials with preemergent herbicides to improve longevity of weed control in container nursery stock (1970). [*Whitcomb, Carl E., 1970, Nursery Problems: Solutions Through Research. The Florida Nurseryman, volume 16, pages 6-7]*

Identified the perched water table in containers and restriction of downward flow as being caused by the container bottom (1970). Used a simple sponge with three different dimensions to demonstrate that drainage is a function of porosity of the medium and depth. ***[Whitcomb, Carl E., 1972, Plants, Pots and Drainage. Horticulture Horizons, volume 4, pages 12-13. Also, Whitcomb, Carl E., 1984, text, Plant Production in Containers, 633 pages, published by Lacebark Inc. Stillwater, Ok.]***

First to determine that, contrary to the 'accepted fact' at the time, soil amendments in the planting hole are not only of no benefit but also often restrict rate of plant establishment (1969-1974, with graduate students Robert Burns in Gainesville, Florida and pure sand soils and Joe Schulte in Oklahoma in productive sandy clay loam field soil and subsoil clay).
[Schulte, Joseph R. and Carl E. Whitcomb. 1975. Effects of Soil Amendments and Fertilizer Levels on the Establishment of Silver Maple. Journal of Arboriculture, volume 1, pages 192-195]

First to measure that Bermudagrass severely restricts establishment and growth of woody plants, while St.Augustine grass has a modest stimulating effect (1970-1971, with student Stanley Dean). ***[Whitcomb, Carl E. 1981. Response of Woody Landscape Plants to Bermudagrass Competition and Fertility. Journal of Arboriculture, volume 7, pages 191-194]***

First to study growing plants pot-in-pot in the field (1973, with student Charles Hogan). However, due to the limited drainage of both study sites, all plants died during each of two studies and the technique was abandoned. ***[Hogan, Charles R. and Carl E. Whitcomb, 1974, Producing Container Nursery Stock in the Field. Okla. Ag. Exp. Station Research Report P-704, pages 43-44]***

Studied root pruning via copper toxicity using rigid thin walled copper pipe with a variety of paints and coatings to reduce copper uptake. Following these studies, copper hydroxide was mixed with paint to coat conventional containers for root pruning via copper toxicity (1973-75). After discussions with Dr. Tok Furuta at UC Riverside who had also been studying this technique, the conclusion was reached that this was NOT a desirable way to modify root systems. The studies were abandoned and findings remained in the file drawer.

First to show that with certain species of shrubs or ground covers, sticking multiple cuttings in the same container can accelerate plant quality and reduce production time (with student Roger Bean). ***[Bean, Roger R. and Carl E. Whitcomb, 1973, Effects of Multiple Cuttings per Container and Fertilizer Levels on Visual Appearance, Production Time and Landscape Performance of Juniperus procumbens and Ilex cornuta Burford. Okla. Ag. Exp. Station Research Report P-691, pages 9-10. Also, Whitcomb, Carl E. and Roger Bean, 1975, Multiple Cuttings Per Container and Visual Appearance and Landscape Performance. Okla. Ag. Exp. Station Research Report P-724, pages 33-36]***

First to show that, contrary to 'accepted fact' at the time, extensive top pruning when planting trees harvested bare root or balled-in-burlap IS detrimental to establishment and development of sound branching patterns (1975-1980). ***[Shoup, Steve, Rick Reavis and Carl Whitcomb, 1981, Effects of Pruning and fertilizers on Establishment of Bareroot Deciduous Trees, Journal of Arboriculture, volume 7, pages 155-157]***

First to show that, contrary to the 'accepted fact' at the time, fertilizing newly planted trees, shrubs and annuals IS NOT detrimental but is profoundly beneficial when the nutrient elements applied are deficient (1975-1980). ***[Shoup, Steve, Rick Reavis and Carl Whitcomb, 1981, Effects of Pruning and Fertilizers on Establishment of Bareroot Deciduous Trees, Journal of Arboriculture, volume 7, pages 155-157]***

Developed testing procedures for giving students immediate, positive feedback during examinations while teaching plant identification (1970-1975). The techniques used were a refinement of procedures used by Dr. Ray Keen at Kansas State University.

Developed testing procedures for giving students immediate, positive feedback following essay exams (1976-1978). To the best of my knowledge this had never been done before. Instead of a student waiting days or weeks to know the results of an exam, they received a copy of the key as soon as they finished the exam. It soon became clear that EVERY student read the key in detail; therefore additional information was presented in the key above and beyond what the student was expected to have in their answer. This made the exam not only an evaluation procedure, but a learning procedure as well, plus no class time was needed to 'go over the exam'.

[Whitcomb, Carl E., 1984, Immediate Feedback Makes Exams A Positive Learning Experience, HortScience, volume 19, page 905]

First to show that tree seedlings in air-root-pruning bottomless milk carton containers with incorporated slow release fertilizers were larger in one growing season than bare root, bed grown seedlings three years old (1976-1979, with graduate student Robert Hathaway). ***[Hathaway, Robert D. and Carl E. Whitcomb, 1984, Nutrition and Performance of Container Grown Japanese Black Pine Seedlings. Journal of Environmental Horticulture, volume 2, pages 9-12]***

First to create a container design that trapped root tips which in turn stimulated root branching. USA Patent #4,497,132. (1983, with student Jerry Williams). ***[Whitcomb, Carl E. and Jerry D. Williams, 1985, Stair step Container for Improved Root Growth. HortScience, volume 20, pages 66-67]***

First to create containers with various openings in the sidewalls for air-root-pruning. USA Patent#4,442,628 and 4,510,712. (1977-1979, with students Robert Birchell and Sancho Dickinson). ***[Whitcomb, Carl E. 1981, A Vertical Air-Root-Pruning Container. Proceedings International Plant Propagators Soc. Volume 31, pages 591-597]***

Wrote the first comprehensive text for teaching plant identification of the trees, shrubs, vines and ground covers, east of the Rocky Mountains. Know It and Grow It: a guide to the identification and use of landscape plants. ***(First published 1975, [yes, it was published before Dirr], currently in it's 3rd edition with over 800 pages and 2000 photos)***

Coated fertilizer granules with preemergent herbicides to accomplish two tasks in one. (1975)

First to develop long term slow release fertilizers lasting two years or more in containers (1971-1977, with chemist Joe Keely, Swift and Co.)

First to show that plants stressed from lack of light or leaf removal restricted root growth long before symptoms could be detected in above ground parts. (1976, with student Lisa Euchner). ***[Whitcomb, Carl E. and L.K. Euchner, 1979, Effects of Shade Levels on Growth of Container Nursery Stock. Nursery Research Journal, volume 6, pages 1-11]***

First to study the interrelationships of the six micronutrients in container production. Patented the formula for Micromax micronutrient fertilizer. USA Patent#4,328,025. Introduced and manufactured by Sierra Chemical Co. Milpitas, CA. and sold worldwide. Later licensed to Grace-Sierra and presently the Scott's Co. ((1979, with professor of statistics Dr. William Warde and graduate student Allan Storjohann) ***[Whitcomb, Carl E., Allan Storjohann and William D. Warde, 1981, Micromax-Micronutrients for Improved Plant Growth. Proceedings International Plant Propagators Soc. Volume 30, pages 462-467. Also, Whitcomb, Carl E. 1981, Effects of Micronutrients Nutrition During Propagation on Container Plant Production. Proceedings International Plant Propagators Soc. Volume 30, pages 468-473]***

First to show that the chemistry of the water used to mist cuttings influenced rooting. (1977*). [Whitcomb, Carl E. 1977, A solar Greenhouse for Propagation. Proceedings International Plant Propagators Soc. volume 27, pages 394-397. Also, Whitcomb, Carl E. 1983, Rooting Cuttings Under A Wet Tent. Proceedings International Plant Propagators Soc. volume 32, pages 450-454]*

Developed and patented a practical solar heated greenhouse. USA Patent#4,173,212. (1977). ***[Whitcomb, Carl E. 1978, A Self-Contained Solar Heated Greenhouse. HortScience, volume 13, pages 30-32]***

First to demonstrate that some trees and ground covers are compatible while others are restrictive of the growth of the other plant (with student Steve Shoup). ***[Shoup, Steve and Carl E. Whitcomb, 1981, Interactions Between Trees and Ground Covers. Journal of Arboriculture, volume 7, pages 186-187]***

Developed and patented crapemyrtle cultivar 'Centennial Spirit'. USA Patent#6,265. (1983, with Charlie Gray and Billy Cavanaugh). ***[Whitcomb, Carl E., Charlie Gray and Billy Cavanaugh, 1985, 'Centennial Spirit' Crapemyrtle. HortScience, volume 20, pages 1144-1145]***

Developed and patented crapemyrtle cultivar 'Prairie Lace'. USA Patent#6,365. (1984, with Charlie Gray and Billy Cavanaugh). ***[Whitcomb, Carl E., Charlie Gray and Billy Cavanaugh, 1984, 'Prairie Lace' Crapemyrtle. HortScience, volume 19, pages 737-738]***

Developed lacebark elm cultivar 'Prairie Shade'. (1982, with student Gary Hickman) ***[Hickman, Gary, Bonnie Appleton and Carl E. Whitcomb, 1982, Vegetative Propagation and Evaluation of Five Ulmus parvifolia, Lacebark Elm Selections. Okla. Ag. Exp. Station Research Report P-829, pages 16-18]***

First to show that, contrary to the 'accepted fact' at the time, that pruning of roots of bare root plants when planting into containers has no detrimental effect on the plant. New roots originate at the point where the roots were cut. (1983-84, with former student Don Richards). ***[Whitcomb, Carl E. 1986, Influence of root Pruning and Fertilizer on Survival and Quality of Two Bare-Root Rose Cultivars. Journal Environmental Horticulture, volume 4, pages 29-32]***

First to develop an insulated pallet for producing and overwintering plants (1982-83, with student Jerry Williams). ***[Whitcomb, Carl E. and J.D. Williams, 1984, An Insulated Pallet to Reduce Labor Cost and Temperature Stress in Container Plant Production. Proceedings International Plant Propagators Soc. volume 34, pages 500-505]***

First to demonstrate that pine tip moth could be controlled by systemic insecticides after invading bud tissues (with student Jim King). ***[King, James E., Richard Price, Kenneth Pinkston and Carl E. Whitcomb, 1983, Control of Nantucket Pine Tip Moth, Rhyacionia frustrana, on Nursery-Grown Pine with Granular Systemic Insecticides. Journal Environmental Horticulture, volume 1, pages 40-42]***

First to show that, contrary to the 'accepted fact' at the time, that movement of seeds in the few days prior to germination was responsible for many kinked and deformed root systems, especially on oaks, pecans and other nut trees. (1983, with graduate student Bonnie Appleton). ***[Appleton, B.L., Carl E. Whitcomb and S.W. Akers, 1986, Effects of Seed Handling, Pre-Germination and Planting Position on Tree Seedling Root and Stem Development. Journal Environmental Horticulture, volume 4, pages 29-32]***

First to demonstrate that producing trees in the field in fabric containers then finishing in above ground containers was a viable and cost effective technique (1980-1983).

[Whitcomb, Carl E., 1985, Innovations and the Nursery Industry. Journal Environmental Horticulture, volume 3, pages 33-38]

First to demonstrate that cutting back the long roots of trees harvested bare root has no detrimental effect when planting into containers or the field. (In cooperation with former student Don Richards and Carrolton Plants Nursery). (1980-1982) ***[Richards, Don and Carl E. Whitcomb, 1980, Effects of Nutrition During Propagation and Date ;of Planting-Out on Quality of Nursery Stock. Okla. Ag. Exp. Station Research Report P-803, pages 37-41. Also, Whitcomb, Carl E., Don Richards, Charlie Gray and Billy Cavanaugh, 1985, Performance of Oregon-Grown Bare Root Whips with Various Treatments During Lining Out in the Field. Okla. Ag. Exp. Station Research Report, P-872, pages 45-47]***

First to demonstrate, and contrary to the popular view of that day, that simply digging a larger planting hole provided a great benefit to the establishment of newly planted trees (with students Ken Preaus, Robert Bridel and Bonnie Appleton). ***[Preaus, Kenneth and Carl E. Whitcomb, 1980, Transplanting Landscape Trees. Journal of Arboriculture volume 6, pages 221-223. Also, Bridel, Robert, Carl E. Whitcomb and Bonnie Appleton, 1983, Planting Techniques for Tree Spade Doug Trees. Journal of Arboriculture, volume 9, pages 282-284]***

First to demonstrate that the timeliness of transplant date of plants grown in containers is critical for continued accelerated growth (with graduate student, Bonnie Appleton). ***[Appleton, B.L. and Carl E. Whitcomb, 1983, Effects of Container Size and Transplanting Date on the Growth of Tree Seedlings. Journal Environmental Horticulture, volume 1, pages 89-93]***

First to determine, and contrary to popular belief, that a few preemergent herbicides can be used in greenhouses (with Dr. Paul Santelmann). ***[Whitcomb, Carl E. and Paul Santelmann, 1983, Evaluation of Herbicides for use in Closed Structures. Journal Environmental Horticulture, volume 1, pages 93-95]***

First to identify striking differences among lacebark elm seedlings to root from cuttings and grow into acceptable trees. (1981, with student Gary Hickman)

[Whitcomb, Carl E., 1984, Propagating Trees From Cuttings. Proc. Southern Nursery Research Conf. volume 29, pages 200-201]

Wrote and published first comprehensive text, Plant Production in Containers. (1984, 633 pages).

First to determine that propagation container dimensions are critical for accelerated plant growth (with student Chris Threadgill). ***[Threadgill, C.C., Carl E. Whitcomb and R. McNew, 1985, Effects of Propagation Container Dimensions and Media on Growth of Four Nursery Crops. Journal Environmental Horticulture, volume 3, pages 126-131]***

First to show that chemistry of the irrigation water must be considered when determining optimum calcium and magnesium levels in a container growth medium (1985, with student Don Brosh). ***[Brosh, D.L., Carl E. Whitcomb, S.W. Akers and P.L. Claypool, 1987, Water Quality and Calcium plus Magnesium Fertilization Effects on Container-Grown Gardenia and Japanese Holly. Journal Environmental Horticulture, volume 5, pages 49-52. Also, Whitcomb, Carl E. 1988, Calcium Magnesium and Irrigation Water. Proceedings International Plant Propagators Soc. volume 38, pages 425-429. Also, Whitcomb, Carl E. 1992, Effects of Water Quality and Water Management on the Growth of Container Nursery Stock. Proceedings International Plant Propagators Soc. volume 41, pages 672-677]***

Wrote and published first comprehensive text, Production of Landscape Plants (in the field) (1987), Revised 2001, Production of Landscape Plants II, 740 pages.

Wrote and published first comprehensive text, Establishment and Maintenance of Landscape Plants (1987)

Designed and patented the RootMaker® container for air-root-pruning on the sides as well as the bottom. USA Patent#4,753,037. (1987) ***[Whitcomb, Carl E. 1989, Roots For The Future. Proceedings International Plant Propagators Soc. volume 39, pages 170-174]***

Plant Growing Method and Container. European Patent #0240365

Plant Growing Method and Container for Plants to be Transplanted. Australian Patent #476677.

Designed and patented the RootBuilder® expandable container for air-root-pruning on the sides of large containers. USA Patent#4,939,865 and 4,716,680. (1987-1989, with Harold Stephens)

Developed and patented the RootCeller®, a plant containment system above ground that insulates and protects roots of container nursery stock from temperature extremes and prevents blow over. USA Patent#4,793,097. (1988)

Developed and patented a water mat for sub irrigating plants growing in containers. USA Patent#4,729,189. (1988)

Developed and patented the WaterTrof®, a sub irrigation device for watering plants growing in containers. USA Patent#5,036,619. (1989)

Designed and developed the Knit Fabric In-Ground Container for constriction (girdling) of plant roots while growing nursery stock in the field. (1990)

First to demonstrate that trees grown in the field in Knit Fabric In-Ground Containers could be easily harvested using a nylon strap around the trunk while they are dormant. (1996). ***[Whitcomb, Carl, 1998, Tree Harvest, As Easy as 1,2,3. Nursery Manager, volume —, pages ——]***

First to demonstrate that Christmas trees grown in Knit Fabric In-Ground Containers could be harvested with a strap and a simple lever and those trees grown this way not only remain fresh and attractive when used indoors for several weeks, but also survive when planted into the landscape. ***[Whitcomb, Carl E., 2000, Growing Christmas Trees in Knit Bags or Selling Truly Living Christmas Trees vs. Trees That Were Once Alive. Proceedings Oklahoma and Arkansas Horticultural Industries, volume 19, pages 243-245]***

Developed and patented the RootMaker® II container design for effective air-root-pruning with less production cost. USA Patent#5,557,886. (1999)

First to demonstrate that nursery stock in the field, when fully dormant, could be sprayed over the top with a combination of Roundup and preemergent herbicide. This controls winter annuals as well as spring and summer weeds. (1992)

First to determine that plants growing in containers could be accelerated in growth and branching even though no deficiencies could be measured or observed. ***[Whitcomb, Carl E. 1992, Is Green Good Enough. Proceedings International Plant Propagators Society Proc. Volume 42, pages 337-339]***

First to demonstrate that soil could be used in container growth medium, as long as, the soil column was maintained separate from the soilless growth medium. This technique has been used successfully in hanging baskets and patio plants to reduce watering frequency and improve plant performance. (1990) ***[Whitcomb, Carl, 1999, Producing Patio Plants That Last. Nursery Manager, volume —, pages 87]***

First to demonstrate that by drilling holes around chlorotic trees or shrubs and filling the holes with a combination of sulfur, micronutrients and a slow release fertilizer, that chlorosis could be solved for many years, even in alkaline clay soils. (1986-1989).

Developed a system of high light intensity and high humidity for propagating plants from cuttings. Redbud and sugar maple cultivars were rooted, whereas all previous attempts failed (1997). ***[Whitcomb, Carl E. 1997, High Light with Moderated Temperatures Aids the Rooting of Softwood Cuttings. Proceedings International Plant Propagators Soc., volume 47, pages 403-406]***

Developed a greenhouse ventilation system using air-inflated tubing at openings in the sides as well as at roof vents for superior temperature control, without drafts. (1994)

Developed and patented crapemyrtle cultivar 'Whit I", Raspberry Sundae® with fragrant flowers and columnar growth. USA Plant Patent#10297. (1997)

Developed and patented crapemyrtle cultivar 'Whit II", Dynamite® a tree form with true red flowers. USA Plant Patent#10296. (1997)

Developed and patented crapemyrtle cultivar 'Whit III', Pink Velour®, with wine foliage and shrill pink flowers. USA Plant Patent#10319. (1997)

Developed and patented crapemyrtle cultivar 'Whit IV', Red Rocket®, a tree form with huge red flower clusters. USA Plant Patent#11342. (1998)

Developed and patented crapemyrtle cultivar 'Whit V', Tightwad Red®, a sterile, true dwarf with red flowers. USA Plant Patent#11312. (1998)

Developed the first practical way to utilize the insulation and moisture holding capacity of the cavity of a cinder block for the production of plants and even tall plants do not blow over. (1997) ***[Whitcomb, Carl E. 1999, Growing In A Cinder Block. Proceedings International Plant Propagators Soc. volume 49, pages 527-531]***

Assembled and published a comprehensive report detailing plant and environmental effects of sulfonylurea and other ALS inhibiting herbicides. ***[Whitcomb, Carl E., 1999, An Introduction to ALS-Inhibiting Herbicides. Toxicology and Industrial Health, volume 15, pages231-239]***