



1988

Annual Report of the Tennessee Agricultural Experiment Station, 1988

University of Tennessee Agricultural Experiment Station

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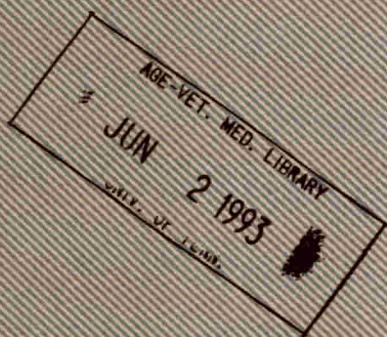
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Annual Report of the

Tennessee

Agricultural Experiment Station
1988



The University of Tennessee
Knoxville

**One Hundred and First
Annual Report
1988**

**The University of Tennessee
Agricultural Experiment Station**

Lamar Alexander President of the University
D.M. Gossett Vice President for Agriculture
D.O. Richardson Dean
J.I. Sewell Associate Dean
T.H. Klindt Assistant Dean

**The University of Tennessee
Knoxville**

E11-0415-00-007-93

LETTER OF TRANSMITTAL

Knoxville, Tennessee

January 2, 1989

To His Excellency, Ned McWherter
Governor of Tennessee:

SIR: I have the honor transmitting herewith, on behalf of the Board of Trustees of the University of Tennessee, a report of the work and expenditures of the Agricultural Experiment Station for the year 1988.

This report is submitted in accordance with the law requiring that such a report be submitted annually by the administrators of the Experiment Station to the Governor of the State.

Respectfully submitted,
Lamar Alexander, President

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One Hundred and First Annual Report of The University of Tennessee Agricultural Experiment Station 1988

FOREWORD

Included in this report are listings by departments of the following information:

- 1) Research projects active as of December 31, 1988;
- 2) Research projects terminated during the calendar year, 1988.
- 3) Bulletins, articles, and reports prepared by Experiment Station staff members and published during the calendar year 1988.

In addition, the report contains the financial statement for the Agricultural Experiment Station covering the period July 1, 1987 to June 30, 1988. Also included is a list of the Experiment Station personnel for the calendar year 1988.

Active Projects

As of December 31, 1988, there were 162 Hatch (TN) projects and four state (S) projects. Hatch projects are supported in part with Federal-Grant funds made available by Congress to the Agricultural Experiment Stations of the country under the Hatch Act Amended. State projects are supported entirely by University funds. There were nine McIntire-Stennis (forestry) projects.

The headquarters of the Tennessee Agricultural Experiment Station is located on the agricultural campus of the University of Tennessee at Knoxville. In addition, there are other research centers which represent soil and climate conditions in the major regions of Tennessee. These other research centers are listed in this report, and their locations are shown on the map on page 5.

Projects Terminated

During 1988, 42 projects were terminated. Reports on these projects have either been published or are being prepared for publication.

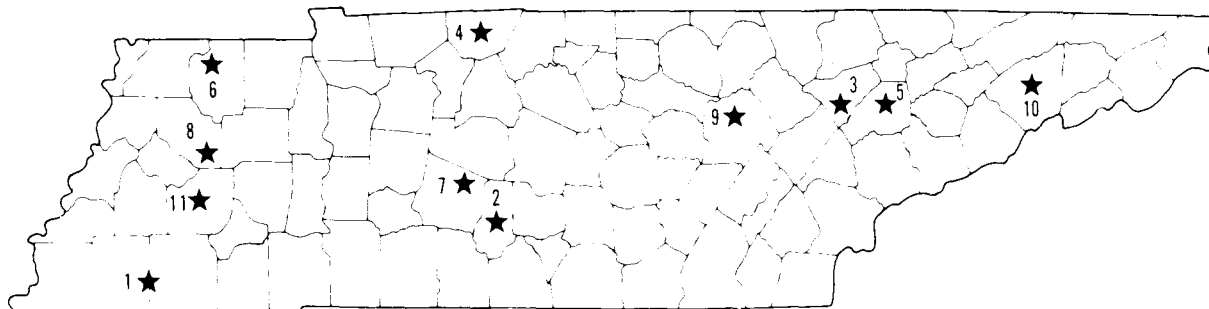
Publications

Published reports on research of the University of Tennessee Agricultural Experiment Station appear in the Station Bulletins, in Research Reports, in *Tennessee Farm and Home Science*, in professional, technical periodicals and various popular publications. Ten Station Bulletins and 24 Research Reports were published during the year. These publications and other technical, semi-technical, and special reports prepared and published during 1988 are listed in this annual report.

FINANCIAL STATEMENT
July 1, 1987 - June 30, 1988
The University of Tennessee Agricultural Experiment Station
Statement of Expenditures By Source

	HATCH	REG. RESOURCE	McINTIRE STENNIS	ANIMAL HEALTH & DISEASE	GRANTS & CONTRACTS	STATE & OTHER	TOTAL
Professional Salaries	\$ 2,597,535	634,894	257,882	2,818	560,172	4,699,985	8,753,285
Clerical Salaries	464,979	27,173	51,712	14,262	124,695	2,354,723	3,037,544
Biweekly Wages	10,222			11,730	173,547	10,080,401	1,275,900
Operating & Misc.	88,759	9,099	7,942	21,235	722,417	6,424,585	7,274,038
Equipment & Capital Outlay	49,526	7,263	11,032	14,405	334,754	1,462,345	1,879,325
Total	\$ 3,211,021	678,428	328,569	64,669	1,915,585	16,022,039	22,220,091

Agricultural Experiment Station Research Centers



- | | |
|---|---|
| 1 Ames Plantation
Fayette and Hardeman Counties, Grand Junction | 7 Middle Tennessee Experiment Station
Maury County, Spring Hill |
| 2 Dairy Experiment Station
Marshall County, Lewisburg | 8 Milan Experiment Station
Gibson County, Milan |
| 3 Forestry Experiment Station
Anderson County, Oak Ridge | 9 Plateau Experiment Station
Cumberland County, Crossville |
| 4 Highland Rim Experiment Station
Robertson County, Springfield | 10 Tobacco Experiment Station
Greene County, Greeneville |
| 5 Knoxville Experiment Station
Poultry, Ornamental Horticulture, and Dairy Units,
Knox County, Knoxville | 11 West Tennessee Experiment Station
Madison County, Jackson |
| 6 Martin Experiment Station
Weakley County, Martin | |

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

Proj. No.

Research Project Titles

TN 713	Economic Evaluation of Technological and Institutional Changes on Farmers in Tennessee
TN 736 (S-194)	Barriers and Incentives to Affordable Housing
TN 751	Retail Demand for Tennessee Fresh Fruits and Vegetables
TN 769	Tennessee Agriculture's Response to Alternative Socioeconomic Environments
TN 783	Economics of the Production of Tobacco and Alternative Enterprises in Tennessee
TN 790	Demographic Trends of the Tennessee Rural and Farm Population
TN 796	Economic Problems of Beginning Farmers
TN 825	Economic Analysis of Machinery Input on Tennessee Farms
TN 826	Potential for Limiting Liability Associated with the Use of Agricultural Chemicals
TN 839 (S-209)	Analysis of Structural and Organizational Change in Rural Counties in the South
TN 841	The Economic and Environmental Consequences of Alternative Farming Systems
TN 850 (S-216)	Changing Patterns of Food Demand and Consumption Behavior
TN 866	Economics of Winegrape Production and the Wine Industry in Tennessee
TN 870 (S-217)	Economic and Technical Forces Shaping the Southern Dairy Industry
TN 871 (S-103)	Technical and Economic Efficiencies of Producing and Marketing Landscape Plants
TN 873 (S-222)	Competition and Change in the Fruit and Vegetable Production and Marketing Systems
TN 876	Economic Analysis of Livestock/Forage Systems
TN 882	Impact Assessment of Soil Erosion Control Policies
TN 885	Profitability and Process of Farm Decisions
TN 892	Consumer Demand for Locally Grown Fresh Produce in Tennessee
TN 893 (S-224)	International Trade Research Commodities Important to the Southern Region
TN 896	Analysis of International and Domestic Tobacco Markets
TN 904	Fiscal Stress and Changes in Taxes and Services of Tennessee Local Governments

- TN 912 (S-227) Economic Analysis of Southern Regional Adjustments to a Dynamic Livestock-Meat Sector
- TN 913 (S-231) Analysis of the Structure, Efficiency and Competitiveness of the Southern U.S. Grain Marketing System
- TN 918 (S-232) Quantifying Long-Run Agricultural Risks and Evaluating Farmer Responses to Risk
- TN 919 (W-178) Water Management and Conservation in Western Irrigated Agricultural

Research Projects Concluded in 1988

- TN 677 Use of No-Tillage and Other Agricultural Practices by Tennessee Farm Operators
- TN 683 (S-172) The Economics of Improving Productivity in Livestock-Meat Systems in the South
- TN 685 (S-176) Marketing Systems for Grains and Soybeans

Publications—1988

Tennessee Agricultural Experiment Station

- Alexander, Robert R., and Burton C. English. *Micro-Oriented Sediment Simulator Version 2.1 User's Manual*, Res. Rept. 88:21.
- Eastwood, David B., John R. Brooker, and R.H. Orr. *State Logos for Fresh and Processed Food: A Study of Consumers in Knox County, Tennessee*, Bull. 661, March.
- Gockowski, James J., and Luther H. Keller. *An Economic Analysis of Trout Production in Tennessee*, Res. Rept. 88:02.
- Huffaker, Ray G., and Gregory K. Pompelli. *The Use of Contracts in the Tennessee Winegrape Market*, Res. Rept. 88:13.
- Leuthold, Frank O., and Cindy Hart. *West Tennessee Farmer's Use of No-Till Planting*, Bull. 660, July.
- Leuthold, Frank O. *Fiscal Stress of Tennessee Rural Counties*, Res. Rept. 88:22, October.
- McBride, William D., S. Darrell Mundy, and Robert M. Ray. *Capital Requirements and Income Opportunities Associated with Alternative Systems of Farrow-to-Finish Swine Production on West Tennessee Farms*, Bull. 662.
- McLemore, Dan L., and Kevin D. Banker. *Pricing Alternatives for Finished Hog Producers in Tennessee*, Res. Rept. 88:19.
- Pompelli, Greg. *Estimating the Potential Demand for Tennessee Wines*, Res. Rept. 88:07.
- Pompelli, Greg, and Kim Haden. *The U.S. Tobacco Marketing System: Current Situation and Identification of Research Needs*, Res. Rept. 88:01.
- Pompelli, Greg. *Tennessee Vineyard Survey 1988*, Res. Rept. 88:15.

Journal Articles

- Brooker, John R., and Careleton Davis. "Optimal Hedging Ratios for Cotton Producers," *Midsouth Journal of Economics and Finance*, 1988:12.

- Brooker, John R., David B. Eastwood, Carol L. Stout, and Robert H. Orr. "Branding Locally Grown Produce in Supermarkets," *Journal of Food Distribution Research*, 1988:29:1.
- Eastwood, David B., D. Terry, and John R. Brooker. "Household Demand for Food Attributes," *Journal of Behavioral Economics*, Vol. 17, 1988:219-227.
- Haden, K.H., and L.W. VanTassell. "Application of Vector Autoregression to Dynamic Relationships Within the U.S. Dairy Sector," *N. Central J. of Agric. Econ.*, 10:2:209-216.
- Huffaker, Ray G., and B. Delworth Gardner. "Rancher Stewardship on Public Lands: A Recent Court Decision," *Natural Resources Journal*, Winter, 1988.
- Isaacs, Steve, and S. Darrell Mundy. "Labor Efficiency Comparisons of the Carousel and Conventional Systems for Stripping and Grading Burley Tobacco," *Tobacco Science*, 1988:32:92-95.
- Leuthold, Frank O. "Principles of Technological Change in American Agriculture with Implications for Chinese Agriculture," *J. Agric. Scientific Information*, Southern Agricultural University, Beibei, China, 1988. (Article was translated in Chinese by Prof. Chen Jufu, Southwest Agricultural University.)
- Pompelli, Greg K., and Dale Heien. "The Demand for Beef Production Cross-Section Estimation of Demographic and Economic Effects," *Western Journal of Agricultural Economics*, 1988:13(1):37-44.
- VanTassell, Larry W., and D.A. Bessler. "Dynamic Price Adjustments Between Commercial and Purebred Cattle Markets," *So. J. of Agric. Econ.*, 20:2:137-143.
- VanTassell, L.W., W.W. McNeill, and R.H. Simms. "An Economic Assessment of Test Performance Measures and Purebred Boar Prices," *J. of Production Agric.*, 1:3:224-229.

M.S. Theses

- Ball, Robert M. "An Economic Feasibility Study for a Fresh Vegetable Packing Facility," 1988, under John Brooker.
- Bryan, Harry D., Jr. "An Economic Analysis of Marketing Trends of Wholesale Nursery Industry in Tennessee," 1988, under John Brooker.
- Bundy, Thomas J., Jr. "An Economic Analysis of Skip-Row Cultural Practices in the Field Production of Burley Tobacco," 1988, under S. Darrell Mundy.
- Cook, Mark L. "An Economic Analysis of Selected Sucker Control Systems for Burley Tobacco," 1988, under S. Darrell Mundy.
- Ingram, John T. "Freeze Probabilities and Cumulative Heat Sums: Their Effect on Tennessee Vegetable Producers," 1988, under John Brooker.
- Shaw, Lowell Kenneth. "The Economic Feasibility of Rural Recycling: A Case Study Approach," 1988, under W.M. Park.

Ph.D. Dissertations

- Goodman, W. Robert. "A Comparison of Alternative Measures of Risk and Application of Risk-Programming Models for Optimal Farm Planning of Burley Tobacco Farms in Tennessee," 1988, under S. Darrell Mundy.
- Morse, Stephen C. "Declining Marginal Utility or Constant Marginal Utility in the Consumer Characteristics Model: A Box-Cox Analysis of the Hedonic Price Equations," 1988, under D.B. Eastwood.

Ralston, Scott N. "The Direct and Indirect Estimation of Recreational Benefits for Reelfoot Lake," 1988, under W.M. Park.

Ushi, Emmanuel U. "Nigerian Agricultural Development Strategy and Policy: A Theoretical Evaluation and Policy Implications," under C.L. Cleland.

Other Writings

Bulletins/Publications

Atwood, J., B. English, K. Frohberg, P.G. Lakshminarayan, V. Sposito. "Analyzing the Tradeoffs Between Minimizing the Cost of Production, of Sediment Damage, and Productivity Loss: An Application of Compromising Programming," 1988. Iowa, 34 pp.

Gardner, B. Delworth, and R.G. Huffaker. "Cutting the Loss from the Federal Water Subsidy," *Choices*, Fourth Quarter 1988.

Hunter, David L., and Luther H. Keller. "Farm Machinery Custom Rates by Crop Reporting Districts in Tennessee, 1987." 1988:PB1085.

Jenkins, Robert P., Larry A. Johnson, Alvin D. Rutledge, David L. Lockwood, and Robert M. Ray. "Planning Budgets for Fruits and Vegetables," A supplement to EC 622, *Farm Planning Manual*, 1988:890:139 pp.

PomPELLI, Greg. "Grape Marketing Notes," *Fruit Notes*, 1988:2.

PomPELLI, Greg. "Winegrape Prices in the Eastern U.S.," *Fruit Notes*, 1988:4.

Papers Presented and/or Proposed

Brooker, John R., "Using Logos to Increase Purchase of Selected Food Products," National Conference on Food Distribution Research Society, 1988.

Brooker, John R., "The U.S. Vegetable Market Supply and Demand: Discussion," Conference on the Market for Vegetables in the Western Hemisphere, Rutgers Univ., 1988.

Brooker, John R., Carleton S. Davis, and Charles M. Farmer. "Risk Considerations and Hedging Strategies," 1988 Proceedings of Beltwide Cotton Production Research Conferences, January 1988 at National Cotton Council, Memphis, TN.

Cleland, C.L. "Requirements for Rural Social Action: The Church," presented at meeting of Rural Sociological Society, August 19-23, Athens, GA.

Downing, Mark E., and Roland K. Roberts. "Consumer-Use Valuation of the University of Tennessee Arboretum," presented at the annual meeting of the Southern Agricultural Economics Association, New Orleans, LA, February, 1988 (abstract).

Eastwood, David B. "Advertising: A Consumer Economics Perspective," *The Frontier Research in the Consumer Interest*, American Council on Consumer Interests, 1988:219-227.

Eastwood, David B. "Publications: The Editors Speak," 17th Annual Conference, Southern Regional Family Economics/Home Management Conference, Athens, GA, February 5, 1988.

Eastwood, David B. "Responses to Mail Surveys: A Modified Total Design Method," Annual Meeting of the Southern Agricultural Economics Association, New Orleans, LA, February 3, 1988.

Eastwood, David B. "Consumer Reactions to Tennessee Logos," Annual Meeting of the Tennessee Fruit and Vegetable Growers Association, Nashville, TN, February 15, 1988.

- Eastwood, David B. "Estimating Human Relationships for Close Substitutes," American Council on Consumer Interests Annual Meeting, Chicago, IL, April 7, 1988.
- Eastwood, David B. "Testing for Constant Utilities of Food Nutrients," Society for the Advancement of Behavioral Economics Annual Meeting, San Diego, CA, June 17, 1988.
- Eastwood, David B. "Hedonic Prices and Declining Marginal Utility," S-216 Regional Committee (Changing Patterns of Food Demand and Consumption Behavior) Annual Meeting, Minneapolis, MN, October 3, 1988.
- English, B.C., and R. Alexander. "The Development of Sediment Modeling for Conservation Policy Analysis," Soil Conservation Service's National Headquarters Seminar Series, March 1988.
- English, B.C., and Gary Cole, "Initial Findings from an Evaluation of the Dairy Bovine Growth Hormone," Dairy Commodity Meeting's Future of the Dairy Industry in Tennessee Workshop, May 1988.
- English, B.C., Gary Cole, Paul Rosenberry, and Phil Vande Kamp. "Evaluation of the Data Needs in Plant Growth Simulators: Experience with the Eros on Productivity Impact Calculator," *Applied Identification Modelling and Simulation: AIMS '87*, R.E. Trahan, editor, The International Association of Science and Technology for Development, ACTA Press, 1988:86-90.
- Fruglestad, Paul, and B.C. English. "Is Policy Analysis Related to Policy?" American Agricultural Economics Association Annual Meeting. Knoxville, TN, August, 1988 (abstract).
- Haden, Kim, and Larry VanTassel. "An Empirical Examination of the Dynamic Relationships within the U.S. Dairy Sector," presented at 1988 SAEA meetings, New Orleans, LA, 1988.
- Hayes, R.M., and R.K. Roberts. "Johnsongrass Management in Soybeans—An Economic Model," presented at the annual meeting of Southern Weed Science Society, Tulsa, OK, Jan. 1988, 1988:41:318 (abstract).
- Huffaker, Ray G. "The Transition of Federal Grazing Policy Toward Permittee Stewardship," selected paper for presentation to the Western Agricultural Economics Association, 1988 (abstract forthcoming in *Western Journal of Agricultural Economics*).
- Huffaker, R.G. "Qualifying for Tax Deductions by Granting Conservation Easement," invited paper for presentation to the Society of Rural Appraisers, 1988.
- Huffaker, R.B. "The Use of Contracts in the Tennessee Winegrape Industry," invited paper for presentation to the Tennessee Viticulture & Oenological Society, 1988.
- Huffaker, R.G. "The Waiver Provisions of the Tennessee Winegrape Law," invited paper for presentation to the Tennessee Viticulture and Oenological Society, 1988.
- Johnson, S.R., K. Frohberg, J. Atwood, B.C. English, B. Eveland, D. Haney, and H. Graham. "Policy Scenarios With the CARD LP Model," a report prepared for the Policy Modeling Symposium, American Agricultural Economics Association Annual Meeting, Knoxville, TN, July 1988.
- Pompelli, Greg. "Marketing Tennessee Wines in Tennessee" Tennessee Viticultural and Oenology Society, Hermitage Hotel, Nashville, TN, 1988.
- Robertson, Thyrele, B.C. English, and Klaus Frohberg. "Probable Impact of Technology on Environmental Concerns in the Great Plains States," International Conference on Dryland Farming, Aug. 15-19, 1988 (abstract).

- Robertson, Thyrele, V. Benson, B.C. English, and Liu Chuang. "Plant Process Models: A New Technology for Policy Analysis, Twenty-fifth International Atlantic Economic Conference, London, England, April, 1988.
- Robertson, T., J. Atwood, and B.C. English. "Modeling Agricultural Production and Nonpoint Source Pollution," poster paper presented at the International Symposium on Water Quality Modeling of Agricultural Nonpoint Sources, Logan, Utah, June 1988 (abstract).
- Robertson, T., B.C. English, and J. Atwood. "The Impact of Abundant Natural Resource Wealth on Resource Conservation," paper presented at the Soil Conservation Society's annual meeting, August, 1988 (abstract).
- VanTassell, L.W., W.W. McNeill, and R.H. Simms. "Determinants of Prices Paid for Production Tested Boars," selected paper at the SAEA meeting, New Orleans, LA, Feb. 1-3, (abstract) *SJAE*, Vol. 20, No. 1, July, p. 199.
- VanTassell, L.W., and C.J. Nixon. "Machinery Replacement Decisions and the Tax Reform Act of 1986," selected paper at the AAEA meeting, Knoxville, TN, Aug. (abstract) *AJAE*, Vol. 70, No. 5, Dec. p. 1186.

Reports/Proceedings

- Douglas, P.V., R.K. Roberts, and W.M. Park. "A Solid Waste Plan for the State of Tennessee," The Tennessee Governor's Roundtable on Solid Waste, Nov. 1988, Nashville, TN.
- Douglas, P.V., R.K. Roberts, and W.M. Park. "The Social Costs of Landfills," presented to the Tennessee Special Legislative Committee on Hazardous Waste, Nov. 1988, Nashville, TN.
- Downing, M.E., and R.K. Roberts. "Non-Market Valuation of Arboreta: A Case Study," presented at the Mid-Atlantic Regional Meeting of the American Association of Botanical Gardens and Arboreta, Longwood Gardens, Kennett Square, PA, Aug. 18-20, 1988.
- English, B.C., D.A. Kapur, and W.H. Meyers. "Iowa, USA: An Agricultural Policy Analysis," Jyoti K. Parikh ed., *Sustainable Development in Agriculture*, 1988, Martinus Nijhoff Publishers.
- Goodman, W.R., B.C. English, G.V. Cole, R.G. Huffaker, and R.R. Alexander. "A Review of Potential Agricultural Policy Contributions Toward the Adaptation, Mitigation, and Prevention of Greenhouse Gas Effects," Report to Martin Marietta Energy Systems.
- Keller, Luther H. "Systems Approach in Farm Management," *Alternative Uses of Highly Erodible Agricultural Land*, Pub. No. Y-201, TVA/OACD-88/8, May, 1988.
- McManus, B.R., "Agricultural Credit: theory and Practice," Ohio Agricultural Credit Conference, Columbus, OH, Oct. 1988.
- McManus, B.R., et al. "Community Documentation: Obtaining Data from Secondary Sources," American Association of Housing Educators Annual Meeting, Corvallis, OR, Oct. 1988.
- McManus, B.R., et al. "Delivery of Housing to the Rural Areas of the South," Southern Housing Conferences: Housing Policy in the South Today and Tomorrow, Atlanta, GA, Dec. 1988.
- VanTassell, L.W. "The Research Implications of the Strategic Decision Making Literature: A Discussion," In *Risk Analysis for Agricultural Production Firms: Concepts, Informational Requirements and Policy Issues*, Dept. of Econ. and Business, N. Carolina St. Univ., Raleigh, NC, July, pp. 166-169.

AGRICULTURAL ENGINEERING

<i>Proj. No.</i>	<i>Research Project Titles</i>
TN 753 (S-195)	Engineering and Management Systems for Cotton Production, Harvesting, and Processing
TN 755 (S-196)	Processing and Storage of Southern Agricultural Commodities Mechanized Production of Selected Vegetable Crops in Tennessee
TN 759	Mechanized Production of Selected Vegetable Crops in Tennessee
TN 765 (S-202)	Utilization of Animal Waste as Energy and Nutrient Sources in Warm, Humid Climates
TN 766 (S-197)	Optimize Production Efficiency of Animal Housing Systems in the Southern Region
TN 786	Drying Grain Sorghum and Minor Crops in Tennessee
TN 816	Application of Artificial Intelligence to Agricultural Research and Production
TN 827	Undertree (non-ice encapsulation) Frost Protection
TN 838 (S-210)	Automatic Control of Field Machinery Functions
TN 872 (S-218)	Control, Prediction, Economics, and Environmental Effects of Soil Erosion
TN 878	Maintenance of Soybean Quality After Field Maturity
TN 887	On-Site Sewage Treatment
TN 888	Evapotranspiration Measurement and Estimation in Tennessee
TN 900	Improvement in the Harvest-to-Market Systems for Air-cured Tobacco
TN 902	Methods for Improving Earth-tube Systems for Energy Exchange Processes

Projects Concluded in 1988

TN 709	On-Site Wastewater Renovation
TN 740	Catalysts for Environmental Control in Animal Confinement Facilities
TN 741	Labor Reduction in Harvesting, Handling, and Curing Air-cured Tobacco
TN 748	A Synergistic Energy System for Fam Structures Using an Earth Tube Coupled with a Heat Pump

Publications—1988

- Bledsoe, B.L. Terminal Report of UTIA Consultant on Solar Energy Applied to Agriculture. CEMIG, Belo Horizonte, MG, Brazil. June.
- Bledsoe, B.L. Solar Energy Applied to Drying Large Round Bales of High Moisture Hay. EMBRAPA Dairy Experiment Station (CNPGL) Coronel Pacheco, Minas Geras, Brazil.
- Bledsoe, B.L. Solar Projects of UTIA Related to Agriculture. CEMIG Energy Conservation Department, Belo Horizonte, Minas Geras, Brazil.

- Coffey, D.L., C.H. Canaday, C.A. Mullins, J.A. Mullins, C.E. Sams and J.E. Wyatt. Research Results on Broccoli 1984-86. Res. Rept. 88-01.
- Henry, Z.A. and W.M. Davis. Moisture Regain at Low Temperature in the Cured Burley Tobacco Leaf. ASAE Paper No. 88-6586. American Society of Agricultural Engineers International Winter Meeting, Chicago, IL.
- Davis, W.M. and Z.A. Henry. Rapid Moisture Content Determination for Cured Burley Tobacco Leaf. ASAE Paper No. 88-6587. American Society of Agricultural Engineers International Winter Meeting, Chicago, IL.
- Emerton, B.L., C.R. Mote, H.H. Dowlen, J.S. Allison, and W.L. Sanders. Comparison of Forced and Naturally Aerated Composting of Dairy Manure Solids. *Applied Engineering in Agriculture* 4(2):159-164.
- Freeland, R.S. and B.L. Bledsoe. Energy Required to Form Large Round Hay Bales - Effect of Operational Procedure and Baler Chamber Type. *Transactions of the ASAE* 31(1):63-67.
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- Freeland, R.S., F.D. Tompkins, and L.R. Wilhelm. Portable Instrumentation to Study Performance of Lawn and Garden Ride-on Tractors. Paper No. 88-1079. American Society of Agricultural Engineers Summer Meeting, Rapid City, SD. June.
- Goldschmid, J.P., Z.A. Henry, L.R. Wilhelm, and R.S. Freeland. Computerized Control System for Drying Grain Sorghum. Paper No. 88-6547. American Society of Agricultural Engineers International Winter Meeting. Chicago, IL. December.
- Henry, Z.A., J.P. Goldschmid, and L.R. Wilhelm. Comparison of ASAE Moisture Isotherm Equations. Paper NO. 88-6558. American Society of Agricultural Engineers International Winter Meeting. Chicago, IL. December.
- Hoffman, F.O., M.L. Frank, B.G. Blaylock, E.J. Deming, R.V. Graham, D.A. Mohrbacher, R.D. von Bernuth, and A.E. Waters. Pasture Grass Interception and Retention of 131I. Environmental Sciences Division, Oak Ridge National Laboratories Research Report. 117 pp.
- Kearney, M.S., F.D. Tompkins, and J.F. Bradley. Reduced Tillage Planting System Performances on Silt Loam Soils. Paper No. 88-1565. American Society of Agricultural Engineers International Winter Meeting. Chicago, IL. December.
- Mote, C.R. On-site Domestic Wastewater Renovation Research Program. East Tennessee Section of the Soil Conservation Society of America.
- Mote, C.R., B.L. Emerton, J.S. Allison, H.H. Dowlen, and S.P. Oliver. Survival of Coliform Bacteria in Static Compost Piles of Dairy Waste Solids Intended for Free Stall Bedding. *Journal of Dairy Science* 71:1676-1681.
- Mullins, J.A., B.L. Bledsoe, R.S. Freeland and J.E. Wyatt. University of Tennessee Tomato Tying Apparatus. Paper No. 88-1576. American Society of Agricultural Engineers International Winter Meeting. Chicago, IL. December.
- Mullins, J.A., B.L. Bledsoe, R.S. Freeland and J.E. Wyatt. Technical Paper No. 88-063. *International Conference on Agricultural Engineering*, Paris, France. March.
- Rutledge, E.M., B.J. Teppen, D.C. Wolf, and C.R. Mote. Storage of Effluent in Septic Tank Filter Fields. American Society of Agronomy, Madison, WI.
- Shelton, C.H. and J.F. Bradley. Controlling Erosion and Sustaining Production with No-till Systems. Presentation to ICI Americas. March.

- Shelton, C.H. and C.R. Mote. Soil Erosion and Water Quality. *Tennessee Farmer*, Vol. 38, No. 9.
- Shelton, C.H. Third End-of-tour Report. Final Report, CEMIG-Rural Demonstration Fram Subprogram. The University of Tennessee, Knoxville. pp. 81-86.
- Sui, Ruixiu, J.B. Wilkerson, L.R. Wilhelm, and F.D. Tompkins. An Experimental Device for Measuring Cotton Plant Morphology. Proceedings of the Beltwide Cotton Conferences. National Cotton Council of America. Memphis, TN. pp. 149-152.
- Tompkins, F.D., W.E. Hart, R.S. Freeland, J.B. Wilkerson, and L.R. Wilhelm. Comparison of Tractor Ground Speed Measurement Techniques. *Transactions of the ASAE*. 31(2):369-374.
- Tompkins, F.D., K.D. Howard, C.R. Mote, and R.S. Freeland. Boom Flow Characteristics with Direct Chemical Injection. Paper No. 88-1593. American Society of Agricultural Engineers International Winter Meeting. Chicago, IL.
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ANIMAL SCIENCE

Proj. No.

Research Project Titles

TN 529	Flexibility in Beef Production from Forage in Tennessee
TN 627	Genetic Variation in Nutrient Intake and Utilization of Grazing Beef Females as Related to Genotype x Environment Interaction
TN 733	The Maintenance of Pregnancy in the Cow: Fetal Material Interactions
TN 767	Selection of Beef Cattle for Optimum Use of Resources
TN 773	Nutritional, Health & Behavioral Management of Purchased Feeder Pigs
TN 774	Genetic & Economic Aspects of Foot Care & Soundness in Dairy Cattle

TN 800	Ontogeny of Corticosteroid Binding Globulin in Swine
TN 803	Effects of Dietary Protein, Dietary Mineral Acid-Base Balance, and Photoperiod on Broiler Chickens
TN 809	Social and Environmental Influence on Reproductive Performance in Swine
TN 811	Postweaning Nutritional Management of Pigs During the Nursery Phase
TN 818	Preshipment Management and Transportation Effects on Subsequent Feeder Pig Performance
TN 819	Alternate Systems of Female Rearing and Reproductive Management in Swine
TN 820 (S-49)	Genetic Methods of Improving Dairy Cattle for the South
TN 844	Effect of Manipulation of Fermentation Dynamics on Silage Production and Animal Performance
TN 845 (NE-112)	Resistance to Mastitis in Dairy Cattle Comparison of Feed Delivery Systems for Lactating Dairy Cows
TN 848	Comparison of Feed Delivery Systems for Lactating Dairy Cows
TN 859	Prepartum Nutrition and Postpartum Health and Performance of Dairy Cows
TN 864	Production and Processing Systems to Produce Lean Beef for the Modern Consumer (in cooperation with Food Technology and Science Dept.)
TN 874	Production Response of Byproducts & Whole Oilseeds in Dairy Rations
TN 875	Changes in Alternate Energy Fuel Metabolism in Progressive Pregnancy and Subsequent Lactation in Ruminants and Their Regulatory Mechanisms
TN 881	Indicators of Reproductive Capacity in the Beef Heifer
TN 884	Alleviation of Fescue Toxicosis Using Prophylactic Drugs or Chemical Treatment
TN 890	Effect of Dietary Energy on Energy Status of Dairy Cattle in Early Lactation
TN 905 (S-145)	Nutrition and Management of Swine for Increased Reproductive Efficiency
TN 915	Fetal-maternal Interactions in the Pig
TN 921 (S-233)	Genetic Relationships to Growth and Reproduction in Diverse Poultry Populations

Projects Concluded in 1988

TN 704	Improvement of Production Efficiency in Straightbred Beef Herds through Heifer Selection
TN 707	Management and Productivity of Fungus-Free and Fungus-Infested Fescue Pastures

TN 723 (S-133)	Genetic-Physiology Mechanisms Associated with Nutrient Utilization in Poultry
TN 731 (S-145)	Nutrition & Management of Swine for Increased Reproductive Efficiency
TN 732	Light Stress and Cardiovascular Abnormalities in Broilers
TN 756	Resistance to Bovine Mastitis during the Dry Period
TN 761 (AHD)	Competitive Exclusion of Environmental Mastitis Pathogens by <i>Corynebacterium Bovis</i>
TN 763 (AHD)	Metabolic Effects of <i>Acremonium Cornophialum</i> Infected Fescue Ingested by Ruminants
TN 802	Improving the Acceptability of Southeastern Feeder Calves
TN 804	Hypothalamic and Ovarian Function in the Postpartum Beef Cow
TN 805	Excretion of Carnitine, Sulphobromophthalein and Cortisol in The Bull Ejaculate
TN 806	Treatment of Retained Placenta with Proteolytic Enzymes and Uterokinetic Drugs
S 90	Use of Highly Prolific Breed x Mutton Breed Crosses to Improve Lamb Production in Tennessee

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ENTOMOLOGY AND PLANT PATHOLOGY

Proj. No.	Research Project Titles
TN 726 (S-186)	Management of Soil Microorganisms Affecting the Health and Vigor of Plants
TN 730 (S-192)	Biological Control of Selected Arthropod Pests and Weeds Through Introduction of Natural Enemies
TN 742	Detection, Identification and Occurrence of Plant Viruses in Tennessee
TN 749	Biology and Control of Fungus Diseases Causing Economic Losses in Cotton, Wheat and Grain Sorghum

- TN 752 Etiology and Epidemiology of *Diaporthe* SP. *Phomopsis* SP. Causing Soybean Stem Canker
- TN 795 Etiology and Epidemiology of Dogwood Canker
- TN 799 Host Plant Residence and Chemical Control for Burley Tobacco Insects
- TN 801 Biosystematics of Pitscales in Tennessee
- TN 812 Etiology, Ecology and Control of Soybean Diseases
- TN 815 Etiology and Control of Fungus Pathogens of Beans
- TN 829 Management and Bionomics of Cotton Insects
- TN 830 Management Strategies for Control of Vegetable Diseases in Tennessee
- TN 836 Population Dynamics of *Heliothis* Species on Wild and Cultivated Plants in Tennessee
- TN 842 (S-212) Biology of Genetically Changing Root-Knot and Cyst Nematodes of Soybeans
- TN 856 Effects of Endophyte Infection on Resistance of Tall Fescue
- TN 857 Aspects of the Population Ecology of Face Flies that Influence the Spread of *Moraxella Bovis*
- TN 867 Biological Control Strategies for Management of Plant Diseases in Woody Ornamental Nurseries
- TN 869 (S-219) Arthropod Induced Stress on Soybean: Evaluation and Management
- TN 877 Bionomics and Management of Insect Pests of Wheat
- TN 899 Effects of Endophyte Infection of Tall Fescue on its Resistance of Soil-Borne Insects
- TN 903 Biology and Ecology of Diptera on Cattle and Horses
- TN 907 (IR-4) A National Agriculture Program to Clear Pest Control Agents and Animal Drugs for Minor Uses
- TN 916 Systematics, Ecology and Pathogenic Potential of Selected Plant-Parasitic Nematodes in Tennessee
- S 96 Pesticide Data Collection and Reporting in Tennessee
- Projects Concluded in 1988**
- TN 700 (S-181) Integrated Arthropod Management for Livestock and Poultry in the Southern Region
- TN 714 Economic Thresholds, Toxicology and Management of the Fall Armyworm and European Corn Borer in Field Corn
- TN 717 Insect Pest Management for Vegetable Crops
- TN 719 Distribution and Ecology of Phytoparasitic Nematodes in Tennessee
- TN 822 Life Table Studies of Root-Knot and Cyst Nematodes

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FOOD TECHNOLOGY AND SCIENCE

<i>Proj. No.</i>	<i>Research Project Titles</i>
TN 758	Food Lipids: Analysis and Effects on Quality
TN 760	Effect of Animal Composition and Processing Methods on Meat Quality
TN 768	Analysis Assay and Control of Mycotoxins in Agricultural Products
TN 807	Effect of Processing Technologies on Acceptance and Shelf Life of Manufactured Meat Products
TN 831	Sensory Evaluation of Foods: Methodological Studies
TN 832	Enzymes in Dairy Products: Characteristics, Effects and Control
TN 834	Determination of Calcium in Dairy Products and the Concentration as Influenced by Processing
TN 835	Evaluation of the Quality and Nutritional Value of Fresh and Processed Fruit
TN 843	Engineering Studies on Dehydrocooling of Vegetables
TN 847 (S214)	Product Development for Increased Utilization of the Sweet Potato
TN 854	Cereal Food Products: Effects of Variations in Formulation and Processing on Quality
TN 861	Microbiological Quality and Safety of Processed Foods
TN 864	Production and Processing Systems to Produce Lean Beef for the Modern Consumer
TN 865	Development of Baked, Breaded Vegetable products with Defined Nutrient Levels and Fried Character
TN 894	Evaluation of Food Crops Grown in Tennessee
TN 895	Iodine Concentration in Milk
S 89	Methods for Dairy Products: Efficiency and Relationship to Product Quality
S 95	Pesticide Residues and their Degredation Products in Raw and Processed Foods

Projects Concluded in 1988

TN 721	Characterization of Antimicrobials in Foods
TN 729	Evaluation of Tennessee Fresh and Processed Vegetables

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- Biswal, R.N. and K. Bozorgmehr. 1988. Mass transfer in osmotic dehydration with sodium chloride. ASAE paper #88-6015. St. Joseph, MI.
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- Collins, J.L., F.A. Draughon and I.E. McCarty. 1987. Destruction of Microorganisms and Deformation of Plastic Jars by Hot Sorghum Syrup. Proceedings of the National Sweet Sorghum Producers & Processors Association, Nashville, TN, March 13-14, 1987. 1:1-12.
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Le Maguer, M. and R.N. Biswal. 1988. Mass transfer in osmotic processes. p. 303-305. in: S. Bruin (ed.). Preconcentration and drying of food materials. Elsevier Publishers B.V., Amsterdam.

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- Sunmonu, Abiodun. Evaluation of temperature, microbial load, and water activity on storage stability of heat processed sweet sorghum juice. M.S. Thesis, The University of Tennessee, Knoxville. June 1988. Jimmy L. Collins.
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- Loveday, H.D. Utilization of mutton. Presented at the Lean Lamb Workshop, University of GA. May 20-21, 1988.
- Penfield, M.P. Aesthetics and food preferences. Home Economics 1520, The University of Tennessee, Knoxville. 1988.
- Penfield, M.P. Sensory Evaluation. Flavorite Laboratories, Inc., Memphis, TN, July 28-29, 1988.

FORESTRY, WILDLIFE, AND FISHERIES

Proj. No.	Research Project Titles
TN 776	The Relationship Between Stress and Reduced Fitness in Food Fish
TN 853	Initiation of Somatic Cell Genetic Research in Forest Trees
TN 862	Biological Improvement of Chestnut (<i>Castanea sp.</i>) Culture and Management of Economically Important Fish Species in Tennessee Waters
MS-38	Biometrical Procedures for Tennessee Forest Management
MS-39	The Impact of Habitat Changes on Wildlife Populations in Southeastern Forests
MS-40	Marketing of Tennessee's Timber Products
MS-41	Genetic Improvement of Selected Hardwood and Coniferous Trees
MS-42	Silviculture Practices to Enhance Forest Productivity in Tennessee
MS-43	Visual Impacts of Vegetation Management on Forest Recreation
MS-44	Cytogenetic Studies of Hardwood and Coniferous Forest Trees
MS-45	Genetic and Cultural Manipulations of Christmas Tree Species in Tennessee
MS-46	Stand Regeneration Using Containerized Seedlings
S 30	Arboretum

Publications—1988

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NUTRITION AND FOOD SCIENCES

Proj. No.

Research Project Titles

TN 745

Carnitine Nutriture in Chronic Alcoholism

TN 750

Changing Dietary Behavior Via Nutrition Education

TN 855	Effect of Dietary Sulfur Upon Fattyacid Metabolism
TN 858	Soluble/Insoluble Dietary Fiber Levels as Effected by Processing Methods and Wheat Cultivars
TN 860	Factors Influencing the Nutritional Health of Adolescents During and Post Pregnancy
TN 880	Effect of Calorie Restriction and Exercise on Age-Associated Physiological/Biochemical Changes of Rats
TN 914	Heating High-fat Foods in Nonwoven Melt Blown Microwavable Material
TN 917	Short-Chain Triglyceride Use in Nutrition Formulas
TN 924	Effect of Shortage on the Reversibility of the Hard-to-Cook Defect in Dried Beans

Projects Concluded in 1988

TN 735	Effect of Diet on Themetabolism of Mercury
TN 828	Physical and Sensory Properties of Nutritionally-Enhanced Baked Products

Publications—1988

Abstracts

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ORNAMENTAL HORTICULTURE AND LANDSCAPE DESIGN

Proj. No.

Research Project Titles

TN 771	Cultivars, Cultural and Mechanical Practices Evaluations in Turfgrass
TN 772	Evaluations of Pesticides Pesticides for Pest Control and Phytotoxicity in Turfgrass
TN 833	Postpropagation Management of Tissue Cultured Linears
TN 863	Development of Tissue Culture Propagation Systems for the Asteraceae
TN 879	Analysis of Non-Nodulation Mutants of Soybean
TN 883	Osmotic Adjustment and Turgor Regulation in Plant Roots
TN 891	Histology of Anthracnose Infections and Breeding Disease Resistance in Flowering Dogwood, Chinese Dogwood and Hybrids
TN 897	Chemical and Nutritional Control and Vertical Evaluations of Florists' Bedding Plants
TN 898	Chemical and Nutritional Control of Plant Growth in Florists' Crops
TN 911	Establishment and Maintenance of Ornamental Plants

Projects Concluded in 1988

TN 703	Propagation of Ornamental Plants
TN 706	Bedding Plant Production Systems and Varietal Evaluations
TN 708	Chemical Control of Plant Growth in Florists' Crops
TN 711	Field Nursery Production Systems
TN 712	Nursery Container Plant Production Systems
TN 716	Post Harvest Handling of Nursery Stock

Publications—1988

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PLANT AND SOIL SCIENCE

<i>Proj. No.</i>	<i>Research Project Titles</i>
TN 566	Evaluation and Breeding of Forage Legumes
TN 705 (S-183)	Life History, Population Dynamics, and Interference: A Basis for Understanding Weed Biology
TN 757 (S-201)	Role of Legume Cover Crops in Conservation Tillage Production Systems
TN 775	Corn Improvement
TN 777 (S-97)	Environmental and Biological Stresses of Rootstocks on Peach Tree Longevity
TN 778	Cotton Production Methodology
TN 779	Variation in Soil Solution Composition in Field Environments
TN 780	Fruit Crop Investigations
TN 781	Environmental Adaptation and Cultural Management of Vegetable Crops
TN 785	Ecology of Crops in Forage Management Systems
TN 787	Low Temperature Photosynthesis, Stem Development and Forage Quality of Tall Fescue
TN 788	Effect of Soil, Soil Fertility Level, Added Nutrients, and Season on Crop Yields
TN 789	Improvement of Small Grain Through Breeding
TN 792	Soil Survey and its Utilization in Tennessee
TN 793	Alteration of Soil Chemical Properties Due to Continuous No-till practices
TN 794	Soil pH and Its Effects on Crop Growth and Nutrient Availability
TN 810	Vegetable Crop Production
TN 813	Dark Tobacco Breeding and Cultural Practices
TN 817	Mineralogy of Selected Soils in the Southern Region
TN 823	Germplasm Development in Forage Grasses
TN 824	Field Crop Responses to Plant Nutrient Application on Soils
TN 849 (S-215)	Behavior and Fate of selected Sulfonyl Urea and Imidazolinone Herbicide in the Southern Environment
TN 851	Soybean Breeding
TN 852 (NC-140)	Rootstock and Interstem Effects on Pome and Stone Fruit Trees
TN 901	Burley Tobacco Genetics, Breeding and Cultural Practices
TN 906 (S-9)	Plant Germplasm Introduction, Increase, Evaluation, Documentation, Maintenance and Distribution

- TN 908 (S-228) Variability of Soil Properties and Its Effect on Water Quality and Soil Management
- TN 909 Quantifying Soil Movement and the Subsequent Affects on Soil Properties and Plant Growth
- TN 910 Factors Affecting Weed Management in Field and Horticultural Crops

Projects Concluded in 1988

- TN 678 (S-175) Mycotoxins of Corn and Other Feed Grains
- TN 684 (S-173) Agricultural Meteorology and Climatology for Production in the Southern Region
- TN 692 Weed Control in Field and Horticultural Crops
- TN 695 (S-179) Cellular and Molecular Genetics for Crop Improvement
- TN 696 (S-70) Biology, Epidemiology, and Control of Viruses and Microplasma-like Organisms Causing Diseases in Corn and Sorghum
- TN 697 (S-9) Plant Germplasm—Its Introduction, Maintenance and Evaluation
- TN 710 Quantifying Past Erosion and Evaluating Erosion and Cover Crop Effects on Yield
- TN 718 Burley Tobacco Genetics, Breeding and Cultural Practices

Publications—1988

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TN 840	Textile Fiber Systems for Performance, Protection and Comfort

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