

Ninety-First
Annual Report
of the
Tennessee Agricultural
Experiment Station
1978

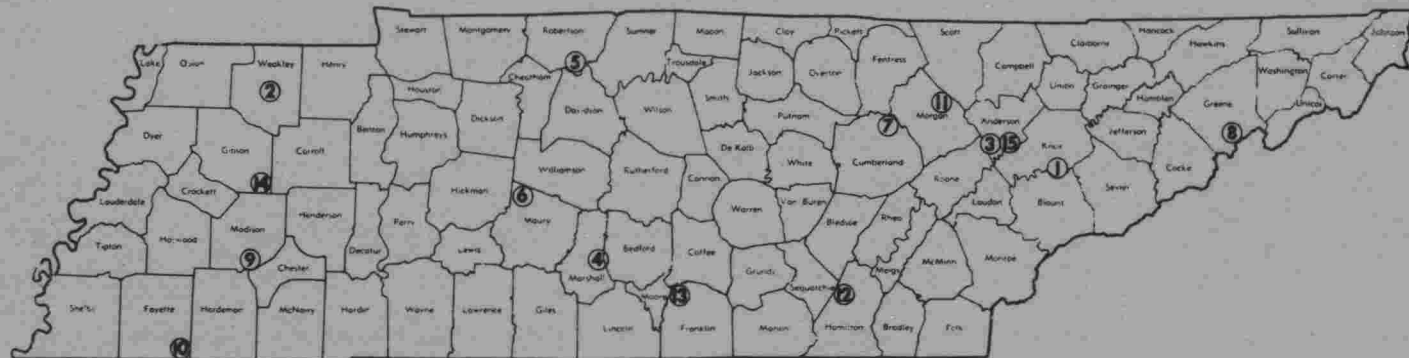
AG-VET. MED. LIB.

MAR 25 1980

UNIV. OF TENN

The University of Tennessee
Knoxville

THE UNIVERSITY OF TENNESSEE AGRICULTURAL EXPERIMENT STATION



1 Main Station

2 University of Tennessee at Martin

Branch Stations

4 Dairy Experiment Station

5 Highland Rim Experiment Station

**6 Middle Tennessee Experiment
Station**

7 Plateau Experiment Station

8 Tobacco Experiment Station

9 West Tennessee Experiment Station

**3 UT Energy Research and Development
Administration Comparative Animal
Research Laboratory**

Field Stations

10 Ames Plantation

11 Cumberland Forestry Field Station

12 Friendship Forestry Field Station

13 Highland Rim Forestry Field Station

14 Milan Field Station

15 Oak Ridge Forest and Arboretum

Ninety-First
Annual Report
1978
Tennessee
Agricultural Experiment Station

Edward J. Boling	President of the University
Webster Pendergrass	Vice President for Agriculture
B. H. Pentecost	Assistant Vice President for Agriculture
D. M. Gossett	Dean
T. J. Whatley	Associate Dean
John I. Sewell	Assistant Dean

The University of Tennessee
Knoxville

LETTER OF TRANSMITTAL

Knoxville, Tennessee
January 2, 1979

To His Excellency, Ray Blanton
Governor of Tennessee:

SIR: I have the honor of 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 1978.

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,
Edward J. Boling, President

CONTENTS

	Page
Foreword.	5
Active Projects	5
Projects Terminated.	5
Financial Statement.	6
Publications	7
Agricultural Biology.	7
Agricultural Economics and Rural Sociology	9
Agricultural Engineering	12
Animal Science	15
Child and Family Studies	17
Comparative Animal Research Laboratory	17
Food Science, Nutrition, and Food Systems Administration	19
Food Technology and Science	20
Forestry, Wildlife, and Fisheries	21
Ornamental Horticulture and Landscape Design	24
Plant and Soil Science	25
Textiles and Clothing	29
Station Personnel	30
Personnel Changes	37

Ninety-First Annual Report of the Tennessee Agricultural Experiment Station 1978

Foreword

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

- 1) Research projects active as of December 31, 1978;
- 2) Research projects terminated during the calendar year 1978;
- 3) Bulletins, articles, and reports prepared by Experiment Station staff members and published during the calendar year 1978.

In addition, this report contains the financial statement for the Agricultural Experiment Station covering the period July 1, 1977 to June 30, 1978. Also included is a list of the Experiment Station personnel for the calendar year 1978.

Active Projects

As of December 31, 1978, there were 143 Hatch projects and 10 State 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.

In addition, there were 13 McIntire-Stennis, and 5 University of Tennessee-Department of Energy projects, and 3 miscellaneous projects.

The headquarters of the Tennessee Agricultural Experiment Station is located on the agricultural campus of the University of Tennessee at Knoxville. The UT-Comparative Animal Research Laboratory is located some 20 miles distant at Oak Ridge, Tennessee. 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 at the end of this report, and their locations are shown on the inside front cover.

Many of the projects involving studies of soils, crops, and livestock may include experimental work at one or more of the outlying stations as well as at the Main Station at Knoxville.

Projects Terminated

During 1978, 37 projects were terminated. Reports on these projects have either been published or are being prepared for publication.

FINANCIAL STATEMENT

July 1, 1977 — June 30, 1978

The University of Tennessee Agricultural Experiment Station

	HATCH ACT-AMENDED		McINTIRE- STENNIS	SPECIFIC GRANTS	NON FEDERAL	TOTALS ALL
	REGULAR	REG. RESEARCH				
FUNDS AVAILABLE	\$2,400,125.70	\$528,509.61	\$255,984.32	\$111,362.89	\$9,207,665.67	\$12,503,648.19
EXPENDITURES						
Personal Services	\$2,235,568.90	\$487,831.60	\$179,288.59	\$ 51,832.45	\$4,424,388.05	\$ 7,378,909.59
Travel	12,408.85	4,024.53	596.90	2,141.80	173,826.57	192,998.65
Equipment	37,918.39	18,211.91	1,212.09	111.00	399,448.35	456,901.74
Land & Structures					31,993.84	31,993.84
Personnel Benefits				4,623.65	780,956.00	785,579.65
All other	21,967.36	3,135.46	266.27	6,784.02	2,734,217.92	2,766,371.03
Unexpended Balances*	92,262.20	15,306.11	74,620.47	45,869.97	662,834.94	890,893.69
TOTALS	\$2,400,125.79	\$528,509.61	\$255,984.32	\$111,362.89	\$9,207,665.67	\$12,503,648.19

* Includes Carryover Obligations

Publications

Published reports on research of the Tennessee Agricultural Experiment Station appear in Station Bulletins, in Tennessee Farm and Home Science, as well as in professional and technical periodicals and in various popular publications. There were 11 Station Bulletins published during the year. The number of technical, semi-technical, and popular articles prepared by staff members and published during 1978 was 170. In addition, staff members published 2 Extension-type publications, and 3 regional bulletins.

AGRICULTURAL BIOLOGY

Proj. No.	Research Project Titles
Hatch 395	Effect of Soil Environmental Conditions on Occurrence and Quantity of Cotton Seedling Pathogens.
Hatch 415	Breeding Disease Resistant Dark Tobacco.
Hatch 418	Diseases of Small Grains.
Hatch 419	Diseases of Ornamentals and Nursery Crops.
Hatch 420	Etiology and Control of Vegetable Diseases.
Hatch 421	Control of Tobacco Insects.
Hatch 423	Biology and Control of Cotton Diseases.
Hatch 431	Detection and Control of Soybean Diseases.
Hatch 438 (S-74)	Ecology, Bio-economics and Management of Arthropod Pests of Soybeans.
Hatch 467 (S-102)	An Integrated System for the Suppression of the Boll Weevil.
Hatch 468 (S-105)	Host Plant Resistance in Cotton to Insects, Mites, Nematodes, and Diseases.
Hatch 469 (S-76)	Nature and Extent of Variation in Root-Knot and Cyst Nematodes.
Hatch 473	Biology and Ecology of Culicidae and Tabanidae.
Hatch 514	Biosystematics & Biological Control of Coccoidea Species in Tennessee.
Hatch 525 (S-90)	Rhizosphere Ecology as Related to Plant Health and Vigor.
Hatch 527 (S-70)	Virus Corn Diseases and Sorghum.
Hatch 533	Identification & Pathogenicity of Selected Plant-Parasitic Nematodes in Tennessee.
Hatch 536	Role of Face Flies in Epidemiology of Infectious Bovine Keratoconjunctivitis (IBK).
Hatch 537	Control of Lepidopterous Pests on Field Corn.

Hatch 544	Management of Vegetable Insect Pests.
Hatch 545	Ecology and Control of Forage and Pasture Insect Pests.
TN (S-85)	Pesticide Impact Assessment Research and Data Analysis.

Projects Concluded in 1978

Hatch 359	Biology & Management of Insects in Yellow-Poplar Seed Orchards.
Hatch 360	Mutation Breeding of Soybeans.
Hatch 398	Biology and Control of Insect Pests of Cattle in Tennessee.
Hatch 440	Pest Management of Vegetable Insect Pests.
Hatch 472	Control of Target Insect Pests on Vegetable Crops.

Bulletins, Articles, and Reports—1978

- Bernard, E. C. A New Species of Nexapodibius from North America, with a Redescription of *Diphascon belicae* (Tardigrada). Transcontinental American Microscopy Society 96(4):476-482, 1977.
- Bernard, E. C. and R. S. Hussey. Movement of Persistence of 1, 2,-dibromo-3-chloropropane in a Soil with a Plow-Pan. Journal of Nematology, Vol. 10, Nov. 3, 1979.
- Chambers, A. Y. and T. C. McCutchen. Evaluation of Soybean Foliar Fungicides, 1977. Fungicide and Nematicide Tests, Results of 1977. American Phytopathology Society 33:106, 1978.
- Chambers, A. Y. and T. C. McCutchen. Reaction of Eight Upland Cotton Varieties to Verticillium Wilt. Proceedings: 1978 Beltwide Cotton Production Research Conference, pp. 26-28, 1978.
- Chambers, A. Y. and T. C. McCutchen. Verticillium Wilt Occurrences and Research in 1977. Proceedings: 1978 Beltwide Cotton Production Research Conference, 5 pp., 1978.
- Chambers, A. Y. and T. C. McCutchen. Further Evaluation of Cotton Soil Fungicides and Methods of Application. Proceedings: 1978 Beltwide Cotton Production Research Conference, 8 pp., 1978.
- Chambers, A. Y. and T. C. McCutchen. Boll Rot Incidence and Research. Proceedings: 1978 Beltwide Cotton Production Research Conference, 11 pp., 1978.
- Chambers, A. Y. and L. F. Johnson. Seedling Disease Occurrence and Research. Proceedings: 1978 Beltwide Cotton Production Research Conference, 10 pp., 1978.
- Gerhardt, R. R. and B. A. Mullens. An Experimental Method for Controlling Face Flies and Horn Flies on Beef Cattle. Tennessee Farm and Home Science No. 105, March 1978.
- Hope, J. H., III. Biology and Control of *Euzophera ostricolorella* Hulst on Yellow-Poplar *Liriodendron tulipifera* L. in Tennessee. M. S. Thesis, University of Tennessee, Knoxville, 50 pp. 1978.

- Hunter, P. P. Chemical Control of Black Shank in Dark Tobacco. American Phytopathology Society Nematicide and Fungicide Tests 34 (In press), 1978.
- Hunter, P. P. and R. J. Stipes. The Effect of Month of Inoculation with *Endothia gyrosa* on Development of Pruned Branch Canker of Pin Oak (*Quercus palustris*). Plant Disease Reporter 62:940-944, 1978.
- Johnson, L. F. (Book Review) Introduction to Soil Microbiology, 2nd ed. 1977, by Martin Alexander. Soil Science 125-:331, 1978.
- Johnson, L. F., D. D. Baird, A. Y. Chambers, and N. B. Shamiyeh. Fungi Associated with Postemergence Seedling Disease of Cotton in Three Soils. Phytopathology 68:917-920, 1978.
- Lambdin, P. L. Control of Insect Pests of Cabbage in Tennessee. Tennessee Farm and Home Science No. 106, June 1978.
- Miller, D. R. and P. L. Lambdin. A New Genus and Two New Species of Asterolecaniid Scale Insects on Palm (Homoptera: Coccoidea: Asterolecaniidae). Proceedings: Entomology Society of Washington 80(2):240-263, 1978.
- Moore, S. M. Evaluation of Systemic Insecticides-Nematicides for Control of Aphids and Their Effect on Selected Non-Target Organisms on Tomato in East Tennessee. M. S. Thesis, University of Tennessee, Knoxville, 1978.
- Pless, C. D. and N. B. Shamiyeh. Promising Insecticides Tested on Dark-Fire-Cured Tobacco. Tennessee Farm and Home Science No. 105, March, 1978.
- Pohlad, B. R. and E. C. Bernard. A New Species of Entophthorales Parasitizing Tardigrades. Mycologia 60(1):135-139, 1978.
- Quintero, Freddy. Effect of Genotype, Row Spacing, and Plant Population on Yield and Agronomic Characters in Soybeans. M. S. Thesis, University of Tennessee, Knoxville, 1978.
- Reed, H. E., A. Y. Chambers, and T. C. McCutchen. Effects of a Chemical Plant Growth Regulator on Control of Foliar Diseases of Wheat. 1977.
- Reed, H. E., A. Y. Chambers, and T. C. McCutchen. Evaluation of Fungicides for Control of Foliar Diseases of Wheat. Fungicide and Nematicide Tests 33: (215), 1978.

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

Proj. No.	Research Project Titles
Hatch 382	The Impact of Demographic Changes of Tennessee Rural Population.
Hatch 385	Economic, Locational, and Institutional Factors Affecting Industrial Plant Location in Non-Metropolitan Areas.
Hatch 388	Social and Psychological Factors Related to Managerial Success.
Hatch 432C	Alternative Systems of Swine Production.
Hatch 439	Tennessee Rural Change Perspectives.

Hatch 443	Economics of Producing and Marketing Woody Ornamentals in the South.
Hatch 451	Economic Analysis of Selected Technologies for Producing Burley Tobacco.
Hatch 464	Supply-Price Relations for Energy, Petrochemicals, and Related Inputs for Tennessee Beef Industry.
Hatch 465	Analysis of Factors Affecting the Short-run and Long-run Demand for Broiler Meat at Wholesale and Retail Market Levels.
Hatch 466	Marketing Performance of Selected Milk Pricing Systems for the Southern Region.
Hatch 484	Assessed Needs Among Elderly in Rural Tennessee.
Hatch 486	Alternative Structures for Increasing Efficiency in Inter- and Intra-Regional Grain Marketing Systems.
Hatch 488	Price Discovery and Informational Flows for Major Agricultural Commodities in the Southern Region.
Hatch 489	Supply, Pricing, and Marketing Alternatives for Cattle, Beef Systems in the South.
Hatch 492	Efficiency of Identification, Assembly, and Transportation of Cotton to Mills and Export Outlets.
Hatch 493	Impact of Farmers Home Administration Financing on Rural Housing.
Hatch 495	The Potential Use of Futures Market Pricing Strategies for Tennessee Agricultural Products.
Hatch 496	Social Organization for Development of Low-Income Rural Counties.
Hatch 497	Analysis of Domestic Food Demand and Consumption Behavior.
Hatch 499	Soybean Production Systems in Tennessee.
Hatch 509	Farm Adjustment Opportunities on Commercial Farms in Tennessee.
Hatch 519	The Effects of Changing Food Prices and Other Intervening Variables on Food Acceptance.
Hatch 523	Organization and Efficiency of the Fruit and Vegetable Production-Marketing Subsector in the South.
Hatch 530	Legal Techniques Available to Farmers in the Management Accumulation and Disposal of Capital Assets.

Projects Concluded in 1978

Hatch 424C	Evaluation of Dairy Waste Management Systems.
Hatch 430	A Socioeconomic Study of Low Income and Part-Time Farmers in Selected Areas of Tennessee.
Hatch 442	An Analysis of Contract Broiler Production in Tennessee.
Hatch 446	Changes in Rural Landownership in Tennessee, 1960-1975.

- Hatch 447 An Economic Analysis of the Marketing System of the Bee-keeping Industry in Tennessee.

Bulletins, Articles, and Reports—1978

- Badenhop, M. B., Thomas H. Lederer, and Brady J. Deaton. Fire Chief's Perceptions of Fire Protection Services in Rural Tennessee Communities. Tennessee Farm and Home Science No. 105, pp. 37-40, March 1978.
- Bolton, William D., and David W. Brown. Rural Juvenile Delinquency: Problems and Needs in East Tennessee. Agricultural Experiment Station Bulletin 580, 47 pp., June 1978.
- Brooker, John R. Direct Shipment of Cotton from Tennessee Gins and Gin-Warehouses to Mills and Export Outlets. Tennessee Farm and Home Science No. 107, pp. 6-9, September 1978.
- Brooker, John R., and Thomas H. King. An Economic Analysis of the Feasibility of Fresh Vegetable Packinghouse Operations in Tennessee. Agricultural Experiment Station Bulletin 577, 56 pp., May 1978.
- Brooker, John R., and Merv J. Yetley. An Economic and Sociologic Analysis of the Marketing Sector of the Tennessee Craft Industry. Agricultural Experiment Station Bulletin No. 578, 34 pp., June 1978.
- Cleland, Charles L., and Ying-Nan Lin. An Overall County Quality of Living Index. Rural Sociology in the South: 1978 (Rural Sociology Section of Southern Association of Agricultural Scientists), 9 pp., 1978.
- Cleland, Charles L. The Ombudsman Function. Teaching-Learning Issues, No. 38, Learning Research Center, University of Tennessee, Fall, 10 pp., 1978.
- Deaton, Brady J., and Maurice R. Landes. Rural Industrialization and the Changing Distribution of Family Incomes. American Journal of Agricultural Economics, 60(5):950-954, 1978.
- Dubov, Irving. Agriculture: Long-Term Analysis. Economic Report to the Governor of the State of Tennessee for 1979, 7 pp., 1978.
- Dubov, Irving. Agriculture Outlook 1977-1979. Survey of Business, 13(3):30-32, 1978.
- Dubov, Irving. Agriculture: Short-Term Analysis, Economic Report to the Governor of the State of Tennessee for 1979, 7 pp., 1978.
- Dubov, Irving, and Charles D. Safley. Impact of Petro-Based Prices on Tennessee Beef Backgrounding Systems. Agricultural Experiment Station Bulletin 585, 28 pp., December 1978.
- Mathia, Gene A., and John R. Brooker. Vine-Ripe Tomato Production and Marketing in North Carolina and Tennessee. Southern Cooperative Series Bulletin 230, 59 pp., June 1978.
- McLemore, Dan L. Comparison of Net Returns from Feeder Cattle Enterprises Since 1970. Tennessee Farm and Home Science No. 108, December 1978.
- McLemore, Dan L. Futures Market Basis Patterns for Tennessee Feeder Cattle and Slaughter Hogs. Agricultural Experiment Station Bulletin 575, 36 pp., February 1978.

- McManus, Ben R., D. O. Baxter, and Earl Wimbish. Financing Low-Cost Minimum-Standard Housing in Rural Tennessee. Agricultural Experiment Station Bulletin 579, 19 pp., June 1978.
- Mundy, S. Darrell, Larry L. Bauer, and Charles B. Sappington. Relative Sensitivity of Selected Distributed Lag Estimators to Measurement and Specification Error. Southern Journal of Agricultural Economics, 10(2):125-131, 1978.
- Mundy, S. Darrell, Morgan D. Gray, and Rodney Thomsen. Variables Related to Farm Real Estate Values in Tennessee Counties. Agricultural Experiment Station Bulletin 576, 15 pp., March 1978.
- Orr, Robert H. "The Need for Transportation Services Among Rural Elderly," Tennessee Farm and Home Science No. 105, pp. 16-18, March 1978.
- Trevena, Billy J. "Factors Affecting the Net Returns of Full-Time Tennessee Hog Farmers," Tennessee Farm and Home Science No. 105, pp. 30-32, March 1978.

AGRICULTURAL ENGINEERING

Proj. No.	Research Project Titles
Tenn 379	Development of Compatible Erosion-Control Practices and Machinery Systems; cooperative with Plant and Soil Science Department and The University of Tennessee Water Resources Research Center.
WRRC A-047-TN	Models to Predict Quality of Runoff Water from Agricultural Watersheds; cooperative with Plant and Soil Science Department and The University of Tennessee Water Resources Research Center.
Tenn 432-B	Alternative Systems of Swine Production; cooperative with Animal Science, Plant and Soil Science, and Agricultural Economics Departments and Ames Plantation.
Tenn 445	Minimizing Energy and Labor in Harvesting and Curing Air-Cured Tobacco.
Tenn 477	Minimum Tillage Equipment for Corn and Vegetable Crops.
Tenn 480	Hydrologic/Water Models for Agriculture and Forestry (contributing to Regional Proj. S-108).
Tenn 494	Evaluation of Selected Physical Properties Affecting Handling of Tennessee Vegetables.
Tenn 516	The Effect of Cotton Fiber Physical Properties on Dust Levels and on Yarn Characteristics.
Tenn 522	Abrasive Band Cutting Device for Severance of Soybean Plants.
Tenn 543	Management Practices for Erosion and Sedimentation Control.
USDA ARS 12-14-7001-567	Solar Energy Applied to Optimum Drying of Forages.

E.I. duPont
deNemours
Grant

Application of Titanium Dioxide on Agricultural Land; cooperative with Plant and Soil Science Department.

Projects Concluded in 1978

- Tenn 294 Engineering Systems for Cotton Production (contributing to Regional Proj. S-69).
- Tenn 424-B Evaluation of Dairy Waste Management Systems; cooperative with the Animal Science and Plant and Soil Science Departments and the Dairy Experiment Station.
- Tenn 441 Animal Waste Treatments and Recycling Systems (contributing to Regional Proj. S-89).
- Tenn 66 Machines for Low-Cost Hay Making on Small Farms; cooperative with Plant and Soil Science and Animal Science Departments.

Bulletins, Articles, and Reports—1978

- Bledsoe, B. L. Drying Forage Packages of High Moisture Hay. Proceedings: 8th Research-Industry Conference, Coastal Bermudagrass Processors Association, Inc., Estill, S. C., pp. 95-117, 1978.
- Bledsoe, B. L. Systems for Making, Handling, Storing and Feeding Large Hay Packages. Proceedings: 35th Southern Pasture and Forage Crop Improvement Conference, SEA-USDA, pp. 35-48, 1978.
- Bledsoe, B. L. Equipment Influence on Hay Feeding Losses. ASAE Paper No. 78-1525, Chicago, Ill., December 1978.
- Bledsoe, B. L. and Z. A. Henry. Duct Geometry for Uniform Drying of Large Hay Packages. ASAE Paper No. 78-3539, Chicago, Ill., December 1978.
- Buntley, George J. and Curtis H. Shelton. Basic Concepts of Soil Erosion. Tennessee Agricultural Extension Publication 807, 1978.
- Duckett, K. E. and C. C. Cheng. A Discussion of Cross-Point Theories of van Wyk. Journal of the Textile Institute 69:55-59, 1978.
- Duckett, K. E. and R. S. Krowicki. Flat-Bundle Tenacity and Energy-to-Break Comparisons for Untreated, Scoured, and Mercerized Cottons. Journal of Applied Polymer Science, Applied Polymer Symposium No. 33, 213-224, 1978.
- Lawson, Reba and H. H. Ramey, Jr. Comparison of Cotton Fineness and Maturity on Air-Flow Instruments. ASTM Journal of Testing and Evaluation 6(4):248-252, 1978.
- Lawson, R., H. H. Ramey, Jr., and W. R. Meredith, Jr. Effect of Durable-Press Resin Treatment on Tenacity and Elongation of Fiber from Upland Cotton Strains. Crop Science 18:1077-1080, 1978.
- McManus, D. O. Baxter and E. Wimbish. Financing Low-Cost Minimum-Standard Housing in Rural Tennessee. Agricultural Experiment Station Bulletin 579, June 1978.
- Safley, L. M., Jr. Energy Conservation Waste Management. Energy Saving Fact Sheet, Tennessee Agricultural Extension Publication 792, May 1978.

- Safley, L. M., Jr. and H. O. Vaigneur. Animal Waste Lagoons in Tennessee. Tennessee Farm and Home Science No. 108, December 1978.
- Shelton, Curtis H. and Gary M. Lessman. Quality Characteristics of Agricultural and Waste Disposal Runoff Water. Journal of Soil and Water Conservation (33)3:134-139, 1978.
- Sukiennik, C. A. and H. H. Ramey, Jr. What Are the Quality Needs of Cotton? Cotton Gin and Oil Mill Press 79(9):24,26,27, 1978.
- Wilhelm, L. R. and D. W. Jones. Cooling Bulk Shipments of Snap Beans. American Vegetable Grower 4(11):66-70, 1978.
- Wilhelm, L. R., C. A. Mullins, and J. L. Collins. Evaluation of Home-Size Solar Dryers. Tennessee Farm and Home Science No. 108, December 1978.

ANIMAL SCIENCE

Proj. No.	Research Project Titles
Hatch 284	Factors Affecting the Rate of Genetic Improvement of Dairy Cattle.
Hatch 432A	Alternative Systems of Swine Production.
Hatch 433	Pre- and Post-Weaning Management of Beef Calves.
Hatch 449	Reproductive Efficiency in the Bovine Male.
Hatch 457	Complete Feed Rations Using Home-Grown Forages for Dairy Cattle.
Hatch 459	Efficiency of Beef Production of Different Size Cows Giving Different Amounts of Milk on Different Quality Pastures.
Hatch 460	Effect of Initial Weight and Winter Feeding Level on Subsequent Performance of Slaughter Beef Heifers.
Hatch 461	Maximum Utilization of High Quality Forages for Dairy Cattle.
Hatch 462	Winter Feeding "Dry" Brood Cows for Efficient Beef Production.
Hatch 463	Improvement of Reproductive Performance in Cattle.
Hatch 471	Development of Improved Feeder Calf Classification Procedures.
Hatch 474	Effect of Feeding Regimen in Gestation on First Lactation of Dairy Heifers.
Hatch 475	Effect of Plane of Nutrition on Mammary Gland Development in Dairy Heifers.
Hatch 478	Quantitation of the Selenium and Vitamin E Requirements of Swine.
Hatch 479	Factors Influencing Iron Utilization for Prevention of Iron Deficiency Anemia in Swine.

Hatch 481	Breeding Methods for Beef Cattle in the Southern Region (contributing to Regional Proj. S-10).
Hatch 482	Genetic Methods of Improving Dairy Cattle for the South (contributing to Regional Proj. S-49).
Hatch 498	Etiology and Control of Hypomagnesemia in Ruminants Utilizing Cool Season Grasses (contributing to Regional Proj. S-121).
Hatch 503	Mycoplasma Gallisepticum and Mycoplasma Synoviae Infections in Commercial Egg Producing Flocks.
Hatch 504	Endocrine Relationship in the Mastitis, Metritis, Agalactia (MMA) Complex in Pigs.
Hatch 511	Hormonal Relationships in Egg Shell Formation.
Hatch 512	Alternatives for Finishing Cattle in Tennessee.
Hatch 515	Endocrine Factors Associated with Transport of Molecules into and out of the Uterus.
Hatch 528	Factors Affecting Nutrient Consumption and Digestibility of Grazed and Harvested Forages.
Hatch 529	Flexibility of Beef Production From Forage in Tennessee.
Hatch 531	Induced Pauses in Laying Hens.
Hatch 535	Absorption of Minerals in Large Animals.
Hatch 538	Effect of Heterosis on Nutritional Efficiency of Beef Production.
Hatch 539	Evaluation of Overseeding Systems for Improvement of Pastures for Beef Production.
Hatch 541	Relationships of Morphological Development of Joints and Long Bones to Skeletal Soundness of Growing Swine.
State 2	Swine Testing and Evaluation.
State 59	Bull Evaluation.
State 79	"Exotic Breeds" of Sheep to Increase Lamb Production in Tennessee.
State 82	Nutritive Value of Agricultural and Industrial Waste Products.

Projects Concluded in 1978

Hatch 155	The Influence of Light Upon Performance of Domestic Chickens.
Hatch 307	Efficiency of Beef Production—Amount of Variation and Criteria for Improvement.
Hatch 317	Feeding Programs for Maximum Efficiency and Optimum Body Composition in Meat Type Swine.
Hatch 339	Mineral Studies in Large Animals Using Radiation and Radioisotope Tracers.

Hatch 342	The Mineral Nutrition of Egg-Production-Type Laying Hen.
Hatch 345	Management of Pastures for Beef Cow Herds.
Hatch 347	Evaluation of Pasture Mixtures and Pasture Management Practices for Beef Production.
Hatch 424A	Dairy Waste Management Systems.
Hatch 458	Photoperiods and Poultry Diseases.
State 80	Variation in Appetite of Angus Heifers Differing in Growth Pattern.

Bulletins, Articles and Reports—1978

- Barth, Karl M., Larry A. Carver, James B. McLaren, Henry A. Fribourg, John T. Connell, and James M. Bryan. Plasma Urea Nitrogen Levels in Beef Steers Grazing Nitrogen-Fertilized Bermudagrass and Orchardgrass-Ladino Pastures. *Journal of Animal Science* 47(2):927-934, 1978.
- Barth, Karl M., Larry A. Carver, James B. McLaren, Henry A. Fribourg, James T. Connell, and James M. Bryan. Total Digestible Nutrient Content of Consumed Forage and Total Digestible Nutrient Consumption by Yearling Beef Steers Grazing Nitrogen-Fertilized Bermudagrass and Orchardgrass-Ladino Clover Pastures. *Journal of Animal Science* 47(3):699-707, 1978.
- Barth, Karl M., W. Warren Gill, and Will T. Butts. Apparent Nutrient Digestibility by Lactating Angus Cows as Related to Certain Body Parameters. *Journal of Animal Science* 46(3):753-760, 1978.
- Barth, Karl M., Atalla Said Mohammed, and Vernon H. Reich. New Wheat Varieties Potentially Suitable for Winter Grazing by Cattle. *Tennessee Farm and Home Science* No. 108, pp. 6-9, 1978.
- Barth, Karl M. and Atalla Said Mohammed. Sodium Hydroxide Treated Wheat Straw as a Potential Feed for Beef Cattle. *Tennessee Farm and Home Science* No. 106, pp. 7-9, 1978.
- Baxter, Harold D., M. J. Montgomery, J. R. Owen, and C. H. Gordon. Formic Acid Treated Wheat Silage for Growing Heifers. *Tennessee Farm and Home Science* No. 108, pp. 20, 1978.
- Bell, Marvin C., J. A. Bacon, G. R. Bratton, and J. E. Wilkinson. Effects of Dietary Selenium and Lead on Selected Tissues of Chicks. *Proceedings: Trace Element Metabolism in Man and Animals — 3*: pp. 604-607, 1978.
- Bell, Marvin C., J. A. Oluokun, Nancy Ramsey, and G. E. Beckmann. Magnesium Treatment of Cows for Grass Tetany. *Feedstuff* 50(6), pp. 24-25, 1978.
- Chamberlain, C. C., K. M. Barth, and H. A. Fribourg. Corn Silage Maturity and Beef Heifer Performance. *Tennessee Agricultural Experiment Station Bulletin* 583, 1978.
- Eiler, Hugo. Effect of Luteinizing Hormone on Ovarian Release of Steroids: Ovarian Vein-Sampling Technique in Conscious Gilt. *American Journal of Veterinary Research* 39:1695, 1978.
- Holloway, Joseph W., J. T. Hopper, W. T. Butts, J. D. Beaty, and N. S. Hall. Forage Intake and Performance of Lactating Beef Cows Grazing High- or Low-Quality Fescue Pastures. *Tennessee Farm and Home Science* No. 106, pp. 13-17, 1978.

- Holloway, Joseph W., J. T. Hopper and W. T. Butts. Animal Variation in Chromium Sesquioxide Excretion Patterns of Grazing Cows. *Journal of Animal Science* 46:1096-1101, 1978.
- McLaren, James B. Preliminary Report of Feeder Cattle Transportation Studies. *Proceedings: Livestock Conservation Institute, 62nd Annual Meeting, Des Moines, Iowa (May 16-18), 1978.*
- McLaren, James B., Ronald E. Morrow, and W. T. Butts. Effect of Age on Estimates of Bovine Growth Curve Parameters. *Journal of Animal Science* 47(2):352-357, 1978.
- Masincupp, Frank B., Michael P. Hunter, and R. L. Murphree. Induction of Puberty in Gilts. *Tennessee Farm and Home Science* No. 106, pp. 2-4, 1978.
- Swanson, E. W. Nutrient Requirements of Dairy Cattle, 5th Rev. Ed. 50:pp. 78 Book. National Academy of Sciences, Washington, D.C.
- Swanson, Eric W. Bovine Mammary Gland Development in Gestation. *Tennessee Farm and Home Science* No. 107, pp. 23-28, 1978.
- Swanson, Eric W., J. K. Miller, and F. C. Madsen. Moderate Soil Eating by Livestock Shown to be Nutritionally Beneficial. *Feedstuffs* 50(43), pp. 30-32, 55, 1978.
- Swanson, E. W., E. M. Convey, L. T. Chapin, and J. W. Thomas. Serum Thyrotropin, Thyroxine, and Tri-iodothyronine in Dairy Cows Fed Varying Amounts of Iodine¹. *Journal of Dairy Science* 61(6), pp. 771-775, 1978.

CHILD AND FAMILY STUDIES

Proj. No.	Research Project Titles
Hatch 513	Role Perception of Working and Non-Working Mothers in Rural and Urban Areas.
Hatch 520 (S-126)	Career Projections and Attainment of Low-Income Youth: Changes Over Time.

Projects Concluded in 1978

Hatch 405	Vocational and Educational Aspirations of Rural School Children and Their Mothers.
-----------	--

COMPARATIVE ANIMAL RESEARCH LABORATORY

Proj. No.	Research Project Titles
2204*	Transport Interactions of Environmental Pollutants with Essential Nutrients.
2287*	Development of Transport Models.
2654*	Mutagenesis in the Long-Lived Mammal.
2655*	Plant Biomass and Energy Conservation.

¹In cooperation with the U. S. Department of Agriculture.

*U.S. Department of Energy Project Numbers.

0210*	Late Somatic Effects of Energy Pollutants.
Hatch 390	Comparative Metabolism of Micro- and Macro-Elements in Animals.
Hatch 401	Mutagenesis and the Development of Mutant Germplasm in Economic Plants.
Hatch 410	Species Comparisons of Pre- and Post-Natal Utilization of Mineral Elements.

Bulletins, Articles, and Reports—1978

- Conger, B. V. Experimental Mutagenesis of Marker Loci in Maize. *Experimental Mutagenesis in Plants*, pp. 318-332, 1978.
- Constantin, M. J. and A. Mokhtarzadeh. Plant Regeneration from Hypocotyl- and Anther-Derived Callus of Berseem Clover. *Crop Science* 18:567-572, 1978.
- Sapra, V. T. and M. J. Constantin. Seed Radiosensitivity of a Hexaploid Triticale. *Environmental and Experimental Botany* 18:77-79, 1978.
- Erickson, B. H. Effect of Continuous Gamma-Radiation on the Stem and Differentiating Spermatogonia of the Adult Rat. *Mutation Research* 52:117-128, 1978.
- Henke, R. R., M. A. Mansur, and M. J. Constantin. Organogenesis and Plantlet Formation from Organ- and Seedling-Derived Calli of Rice (*Oryza sativa*). *Physiologia Plantarum* 44:11-14, 1978.
- Kelman, B. J., B. K. Walter, G. E. Jarboe, and L. B. Sasser. Effect of Dietary Cadmium on Calcium Metabolism in the Rat During Late Gestation. *Proceedings: Society for Experimental Biology and Medicine* 158:614-617, 1978.
- Martin, P. G., B. B. Hitchcock, and J. F. King. Interactions of Cd, Zn, Cu, and Fe in the Anemic Rat. *Trace Substances in Environmental Health—XI*, pp. 201-210, 1978.
- Miller, J. K., C. E. Tysinger, and S. L. Hansard. Effect of Soil Ingestion on Copper and Manganese Utilization by Swine. *Trace Element Metabolism in Man and Animals—3*, pp. 494-497, 1978.
- Miller, J. K., F. C. Madsen, D. E. Lentz, and S. L. Hansard. Role of Carbohydrate Metabolism in Grass Tetany. *Proceedings: Regional Workshop on Grass Tetany, Vol. III*, 1978.
- Noonan, T. R., F. H. Cross, R. A. Reynolds, and R. L. Murphree. Effects of Age, Season, and Reproductive Activity on Hemograms of Female Hereford Cattle. *American Journal of Veterinary Research* 39:433-440, 1978.
- Sasser, L. B., G. E. Jarboe, B. K. Walter, and B. J. Kelman. Absorption of Mercury from Ligated Segments of the Rat Gastrointestinal Tract. *Proceedings: Society for Experimental Biology and Medicine* 157:57-60, 1978.
- Sasser, L. B., R. J. Chertok, M. F. Callahan, and G. E. Jarboe. The Effect of Ca and P on the Absorption of Cd. *Trace Element Metabolism in Man and Animals—3*, pp. 562-565, 1978.

*U.S. Department of Energy Project Numbers.

Schneider, M. D., F. H. Cross, and J. N. Dumont. Burro Aortic Collagen: Platelet Aggregating Activity and Ultrastructural Changes Induced by Plasma. *American Journal of Veterinary Research* 39:399-405, 1978.

FOOD SCIENCE, NUTRITION AND FOOD SYSTEMS ADMINISTRATION

Proj. No.	Research Project Titles *
Hatch 384	Patterns of Food Intake and Nutritional Health of Girls.
Hatch 450	Effect of Vegetarian Diets on Bone Density and Nutrient Intakes of Aging Women.
Hatch 500	Functional Properties of Plant Proteins as Influenced by Other Ingredients of Formulated Foods.
Hatch 501	Effect of Dietary Sulfur on Protein Metabolism.
Hatch 502	Metabolic Alterations In the Genetically Obese Mouse.
Hatch 507	Influence of Dietary Protein on Renal Function, Protein Status and Longevity of Male Rats.
Hatch 519	The Effects of Changing Food Prices and Other Intervening Variables on Food Acceptance.
Hatch 542	Effect of Xenobiotics on Sulfur Metabolism.

Projects Concluded in 1978

Hatch 353	Non-oxidative Reactions of Meat Lipids During Heating and Their Relation to Cooked Meat Quality.
Hatch 396	Effect of Stress on Sulfur Metabolism.
Hatch 454	Effect of Heat on Selected Histological and Physical Properties of Meat.

Bulletins, Articles, and Reports—1978

- Brady, P. L. A Critical Comparison of Beef Semitendinosus Muscle Heated in an Oven and in a Water Bath. Unpublished doctoral dissertation. University of Tennessee, Knoxville, 1978.
- Hearne, L. E., M. P. Penfield, and G. E. Goertz. Heating Effects of Bovine Semitendinosus: Shear, Muscle Fiber Measurements, and Cooking Losses. *J. Food Science* 43:10, 1978.
- Hearne, L. E., M. P. Penfield, and G. E. Goertz. Heating Effects on Bovine Semitendinosus: Phase Contrast Microscopy and Scanning Electron Microscopy. *J. Food Science* 43:13, 1978.
- Mason, R. L., M. E. Kunkel, T. A. Davis, and R. E. Beauchene. Nutrient Intakes of Vegetarian and Nonvegetarian Women. *Tennessee Home and Farm Science* No. 105, 18-21, 1978.
- Wakefield, Troy, Jr. The Relationships of biochemical and Dietary Parameters to Growth in Preadolescent Black and White Girls. Unpublished doctoral dissertation. University of Tennessee, Knoxville, 1978.

FOOD TECHNOLOGY AND SCIENCE

Proj. No.	Research Project Titles
Hatch 393	Flavor Precursors in Protein Concentrates and Isolates.
Hatch 394	Histological and Histochemical Relationships of Muscle to Meat Quality and Cutability.
Hatch 437	The Influence of Processing Factors on Dry-Cured Ham Quality.
Hatch 452	Use of Protein Isolates and Vegetable Fats in Manufactured Meat Products.
Hatch 453	Utilization of Acid Cheese Whey for Food Products.
Hatch 505	Utilization of Modified Proteins in Baked Goods.
Hatch 508	Quality Evaluation of Vegetable Cultivars and Development of Food Products.
Hatch 527	Marketability and Acceptability of Beef Produced Under Forage and Forage-Grain Management Systems.
State 73	Pesticides in/on Raw and Processed Foods.

Projects Concluded in 1978

Hatch 193	Enzymes as Related to Chemical and Physical Characteristics of Vegetables for Freezing.
Hatch 376	Food Color Identification, Notation, and Amelioration with Natural Compounds.
Hatch 391	Quality and Shelf Life of Food Products in the Marketing Channels.
Hatch 397	Characterization and Treatment of Tennessee Food Processing Wastes.
Hatch 436	Influence of Milk Processing Upon Biological Availability of Xanthine Oxidase.

Bulletins, Articles, and Reports—1978

- Calkins, C. R. and G. W. Davis. Refinement of a Muscle Fragmentation Procedure for Predicting Cooked Meat Tenderness. Tennessee Farm and Home Science No. 108, December 1978.
- Collins, J. L. Flavor Preference of Selected Food Products from Vegetables. Journal of Agricultural and Food Chemistry 26(5):1012-15, 1978.
- Collins, J. L. Quality of Snap Beans for Canning and Freezing. Tennessee Farm and Home Science No. 107:20-22, 1978.
- Demott, Bobby Joe and Ong Ard Praepanitchai. Influence of Storage, Heat and Homogenization Upon Xanthine Oxidase Activity of Milk. Journal of Dairy Science 61(2):164-67, 1978.
- Jaynes, Hugh O., Magdy M. Hefnawy, and Claude E. Reeves. A Modified Babcock Method to Determine Oil Content of Snacks. Snack Foods 67(7):39-40, 1978.

- Jaynes, Hugh O., Mei Fung Chen, and Woodrow W. Overcast. Composition of Selected Commercial Salads From the Retail Market. *Journal of Food Protection* 41(7):510-13, 1978.
- Melton, Curtis C. and J. T. Keeton. Factors Associated with Microbial Growth in Ground Beef Extended with Varying Levels of Textured Soy Protein. *Journal of Food Science* 43:1125-29, 1978.
- Mundt, J. O. Effect of Mold Growth on the pH of Tomato Juice. *Journal of Food Protection* 41(4):267-68, 1978.
- Mundt, J. O., J. L. Collins, I. E. McCarty, and Ruth Bailey. Description and Microbiology of Home-Canned Tomatoes and Tomato Juice. *Journal of Food Protection* 41(12):944-47, 1978.
- Mundt, J. O., Ola B. Sanders, and Paul Pak. Effect of Salt on pH and Flavor of Home-Canned Tomatoes and Tomato Juice. *Tennessee Farm and Home Science* No. 107:18-19, 1978.

FORESTRY, WILDLIFE, AND FISHERIES

Proj. No.	Research Project Titles
Hatch 107	Relationship of Soil and Other Site Factors to Forest Composition and Productivity.
Hatch 207	Forest Tree Fertilization.
Hatch 470	Breeding Strategies for Genetic Improvement of Commercial Forest Trees in the South.
Hatch 491	Freshwater Food Animals.
Hatch 521	Culture and Management of Selected Game Fishes.
McIntire-Stennis 3R	Quail Management on Forests and Associated Lands in Tennessee.
McIntire-Stennis 9R	Characteristics of Juvenile and Branch Wood in Selected Eastern Hardwoods.
McIntire-Stennis 16	Economic Importance of Tennessee's Forest Resource and Wood Products Industries.
McIntire-Stennis 17	Attitudes and Preferences Related to Forest Recreation Opportunities.
McIntire-Stennis 19	Regeneration of <i>Dendroctonus</i> -killed Pine Stands in East Tennessee.
McIntire-Stennis 20	Fragmentation of Large Forest Ownerships and Its Impact on Tennessee's Forest Economy.
McIntire-Stennis 21	Development of Systems Analytic and Simulation Techniques for Renewable Resource Management.
McIntire-Stennis 22	Prescribed Fire for Site Preparation and Improved Pine Productivity in Tennessee Forests.
McIntire-Stennis 23	Breeding of Upland Hardwoods.

McIntire-Stennis 24	Breeding of Coniferous Trees.
McIntire-Stennis 25	Defect Estimation of East Tennessee Hardwoods.
McIntire-Stennis 26	Controlling Strip Mine Runoff.
McIntire-Stennis 27	Natural History of Large Mammals in the Southern Appalachian Forests.
State 30	The University of Tennessee Arboretum.
State 70	Forest Cutting and Water Yield.
State 83	Strip Mine Revegetation.
State 84	Implications for Wildlife of Land Use Patterns and Habitat Alterations in Tennessee.

Projects Concluded in 1978

McIntire-Stennis 12R	Ecology of Mammalian Species of the Great Smoky Mountains National Park.
McIntire-Stennis 18	Computer Processing of Forest Inventory Data.

Bulletins, Articles, and Reports—1978

- Buckner, Edward R. Irrigation Modifies Soil Moisture Fluctuations in a Mature Yellow-Poplar Stand and a Young Plantation. *Proceedings: Soil Moisture—Site Productivity Symposium*, pp. 307-315. USDA—Forest Service, Southeastern Area, State and Private Forestry, Atlanta, Georgia, 400 pp., 1978.
- Buckner, Edward R. and Weaver H. McCracken. Yellow-Poplar: A Component of Climax Forests? *Journal of Forestry* 76(7):421-423, 1978.
- Core, Harold A. Characteristics of Yellow-Poplar Wood and Implications Towards Marketing Opportunities. *Proceedings: Marketing and Utilization of Yellow-Poplar*, Institute of Agriculture, The University of Tennessee (David M. Ostermeier, ed.), pp. 49-55, 1978.
- Core, Harold A. and William W. Moschler. A Note in the Prediction of Wood Properties in Yellow-Poplar. *Wood and Fiber* 9(4), 1978.
- Dearden, Boyd L. and Daryl Durham. A Technique for Statistically Differentiating Ruffed Grouse Drumming Logs from Non-Drumming Logs in East Tennessee. *Journal of the Tennessee Academy of Science* 53(3):98-101, 1977.
- DeSelm, H. R., W. H. Martin, and Eyvind Thor. The Forest Vegetation of Wilson Mountain, Tennessee. *Proceedings: Central Hardwood Forest Conference*, pp. 23-38, 1978.
- Dimmick, Ralph W. Yankee Grouse in West Tennessee. *Tennessee Wildlife* 2(1): 8-10, 1978.
- Dimmick, Ralph W. Microtime Rodents in Virginia Pine Plantations: Their Ecology and Measures for Population Control. *Symposium on Management of Pines of the Interior South*, Knoxville, Tennessee, pp. 130-134, 1978.

- Hay, Ronald L. Recent Work with Balsam Woolly Aphids in the Great Smoky Mountains National Park. Proceedings: Southern Forest Insect Work Conference, Blacksburg, Virginia, pp. 30-31, 1978.
- Hay, Ronald L. and C. Christopher Eagar. Fraser Fir in the Great Smoky Mountains National Park: Its Demise by the Balsam Woolly Aphid. Fourth Annual Scientific Research Meeting, Gatlinburg, Tennessee, pp. 38-39, 1978.
- Hay, Ronald L. and William G. Martin. Stand Structure and Species Composition Changes in a Beech-Maple Stand in East Tennessee. Proceedings: Central Hardwood Forest Conference—II, West Lafayette, Indiana, pp. 270-283, 1978.
- Hay, Ronald L. The Champion Pin Cherry. American Forests 84(4):14-15, 62-63, 1978.
- Hay, Ronald L., C. Christopher Eagar, and Kristine D. Johnson. Fraser Fir in the Great Smoky Mountains National Park: Its Demise by the Balsam Woolly Aphid. Contract Report to Regional Chief Scientist, National Park Service, Atlanta, Georgia, 125 pp., 1978.
- Ostermeier, David M. (Editor). Proceedings: Marketing and Utilization of Yellow-Poplar, Institute of Agriculture, The University of Tennessee, 182 pp., 1978.
- Ostermeier, David M. Mobile Home Construction Lumber: A Potential Market for Yellow-Poplar. Proceedings: Marketing and Utilization of Yellow-Poplar, Institute of Agriculture, The University of Tennessee (David M. Ostermeier, ed.), pp. 127-139, 1978.
- Ostermeier, David M. and Robert C. Abt. Studs from Yellow-Poplar: Potential Supplies in the Tennessee Valley Region. Proceedings: Marketing and Utilization of Yellow-Poplar, Institute of Agriculture, The University of Tennessee (David M. Ostermeier, ed.), pp. 140-150, 1978.
- Perry, Kenneth R. and J. Larry Wilson. Effects of the Steroid, Methandrostenolone, on Growth and Gross Pathology of Channel Catfish. Proceedings: Annual Conference Southeastern Association of Fish and Wildlife Agencies, 31:597-602, 1977.
- Rennie, John C. and Harry V. Wiant, Jr. Modification of Freese's Chi-Square Test of Accuracy. Resource Inventory Notes, BLM 14:1-3, 1978.
- Roberts, Thomas H. and Ralph W. Dimmick. Distribution and Breeding Chronology of Woodcock in Tennessee. Proceedings: Annual Conference Southeastern Association of Fish and Wildlife Agencies 32:8-16, 1978.
- Thor, Eyvind and William R. Gall. Variation in Air Pollution Tolerance and Growth Rate Among Progenies of Southern Appalachian White Pine. Proceedings: First Conference of the Metropolitan Tree Improvement Alliance, pp. 80-86, 1978.
- Warren, M. L., Jr. and J. L. Wilson. Parasitic nematode *Contracaecum* in Two Subspecies of Largemouth Bass. The Progressive Fish Culturist 40(4):137, 1978.
- Wells, Garland R. Harvesting Attitudes of Nonindustrial Private Forest Landowners. Technical Papers (R. A. Kluender, ed.), American Pulpwood Association, Washington, D. C., 78(P-81):1, 1978.

- Wells, Garland R. Present and Future Supplies of Yellow-Poplar Stumpage. Proceedings: Marketing and Utilization of Yellow-Poplar, Institute of Agriculture, The University of Tennessee (David M. Ostermeier, ed.), pp. 32-38, 1978.
- White, Douglas W. and Ralph W. Dimmick. Survival and Habitat Use of Northern Ruffed Grouse Introduced into West Tennessee. Proceedings: Annual Conference Southeastern Association of Fish and Wildlife Agencies, 32:1-7, 1978.
- Woods, Frank W., Ronald L. Hay, and Gary H. Irwin. Minisite Preparation for Reforestation of Strip-Mined Lands. Proceedings: Surface Mining and Fish/Wildlife Needs in the Eastern United States, Morgantown, West Virginia, pp. 306-310, 1978.
- Woods, Frank W., Ronald L. Hay, and Gary H. Irwin. Tree Planting on Strip Mines— A Test of Minisite Preparation. Tennessee Farm and Home Science No. 107, p. 14-15, September 1978.

ORNAMENTAL HORTICULTURE AND LANDSCAPE DESIGN

Proj. No.	Research Project Titles
Hatch 370	Shade Tree Cultivars.
Hatch 392	Mutation Breeding in Vegetatively Propagated Flowering Pot Plants and Garden Perennials.
Hatch 425	Pesticide Evaluations, Their Residual Effects and Phytotoxicity in Turfgrasses.
Hatch 426	Cutural and Mechanical Management and Evaluation of Turfgrasses.
Hatch 429	Chemical Control of Plant Growth in Florist Pot Plants and Bedding Plants.
Hatch 534	Production Systems for Nursery Stock.

Bulletins, Articles, and Reports—1978

- Callahan, Lloyd M. Bentgrass Performance Trials for Golf Greens in Tennessee. Tennessee Farm and Home Science No. 105, March 1978.
- Callahan, Lloyd M. Bermudagrass Winterkill of 1977—Causes and Effects. Proceedings: Twelfth Annual Tennessee Turfgrass Conference, 12:1-2, 1978.
- McDaniel, Gary L. [with Georgia L. Breshenham]. Use of Antitranspirant to Improve Water Relations of Cineraria. Hort. Science, 13(4):466-67.
- Smith, G. Shannon. Tallest Tree May Not Be Best Tree. Warren County News, 6 September, 1978.
- Smith, G. Shannon. Seed Scarification to Speed Germination of Ornamental Cycads (*Zamia* spp.), pp. 436-38; N and K Fertilization of Florida Coontie, *Zamia Integrifolia* Ait, pp. 438-39. Hort. Science 13(4).

- Smith, G. Shannon [with Michael Wrigley]. Staking and Pruning Effects on Four Ornamental Trees. Proceedings: SNA Research Conference. Twenty Third Annual Report, pp. 54-55, 1978.
- Smith, G. Shannon. Nitrogen and Potassium Fertilization of Florida Coontie, *Zamia Integrifolia* Ait, pp. 57-59; Growing Plants Upside Down—Ornamental Horticulture in New Zealand, pp. 210-11, 1978. Proceedings: SNA Research Conference. Twenty-Third Annual Report.
- van de Werken, Hendrik [with Dewayne L. Ingram]. Effects of Container Media and Backfill Composition on the Establishment of Container-Grown Plants in the Landscape. Hort. Science, 13(5):583-84, 1978.
- van de Werken, Hendrik. Response of Shade Tree Species Planted in Groves to Spacing, Gravel on Plastic Mulch, and Turf. Tennessee Farm and Home Science No. 107, September 1978.
- van de Werken, Hendrik. Preventing 'Rooting Out' of Container Plants, pp. 21-22; Rapid Development of Shady Groves, pp. 200-201. Proceedings: SNA Research Conference, Twenty-Third Annual Report, 1978.

PLANT AND SOIL SCIENCE

Proj. No.	Research Project Titles
Hatch 399	Soil and Plant Nutrient Status and Environmental Factors in Relation to Crop Yields.
Hatch 400	Effect of Plant Environment on Its Photosynthetic Capability.
Hatch 402	Cotton Seed and Fiber Development.
Hatch 403	Cotton Production and Varietal Adaptation.
Hatch 404	Forage Crop Production and Metabolic Patterns Under Different Management and Environmental Conditions.
Hatch 406	Small Grain Improvement Through Breeding (wheat, oats, barley, and rye).
Hatch 407	Selectivity and Mode of Action of Herbicides and Antidotes.
Hatch 408	Corn Improvement.
Hatch 409	Development and Evaluation of Rootstocks for Peach (contributing to Regional Proj. S-97).
Hatch 411	Vegetable Crop Production.
Hatch 412	Interfacial Reactions in Soils.
Hatch 413	Liming and Its Effect on Nutrient Availability.
Hatch 414	Field Crop Variety Evaluation.
Hatch 416	Plant Growth Regulator Effects on Fruit, Vegetable, and Agonomic Crops.
Hatch 417	Fruit Crop Investigations.
Hatch 428	Soil Survey and Its Relation to Behavior of Different Soils Under Various Uses.

Hatch 444	Forage Crops Ecology and Management.
Hatch 476	Soybean Breeding.
Hatch 483	Forage Grass Genetics and Breeding.
Hatch 487	Minimum Tillage and Double Cropping on Weed Populations and Persistence and Fate of Herbicides (contributing to Regional Proj. S-110).
Hatch 490	Diagnosis and Correction of Manganese and Molybdenum Problems in Legumes (contributing to Regional Project S-117).
Hatch 506	Burley Tobacco Genetics and Breeding.
Hatch 510	Weed Control in Economic Crops.
Hatch 518	Plant Germplasm—Its Introduction, Maintenance, and Evaluation (contributing to Regional Proj. S-9).
Hatch 526	Viruses and Mycoplasma-like Organisms Causing Diseases of Corn and Sorghum (contributing to Regional Proj. S-70).
Hatch 532	Mycotoxins of Corn and Other Feed Grains (contributing to Regional Proj. S-132).
Hatch 540	Soil and Crop Management Systems for Soil Conservation and Erosion Control.

Projects Concluded in 1978

Hatch 255	Fertilization, Soil and Crop Management Systems, Cultural Practices, and Plant Bed Management Systems for Burley Tobacco.
Hatch 532	Mycotoxins of Corn and Other Feed Grains (contributing to Regional Proj. S-132).

Bulletins, Articles, and Reports—1978

- Allen, Fred, R. E. Comstock, and D. C. Rasmusson. Optimal Environments for Yield Testing. *Crop Science* 18:747-751, 1978.
- Bruno, Peter H. and Larry S. Jeffery. Efficacy of Soil Sterilants in Tennessee. *Tennessee Farm and Home Science* No. 105, March 1978.
- Coffey, David L., C. A. Mullins, and J. F. Brown. Summer Squash for Onceover Harvest. *Tennessee Farm and Home Science* No. 105, March 1978.
- Coffey, David L. Vegetable Quality Can Hinge on Soil Fertility. *Tennessee Farmer* 27(2):15-16, 1978.
- Conger, B. V. Experimental Mutagenesis of Marker Loci in Maize. In: *Proceedings: Symposium on Experimental Mutagenesis in Plants*. Publishing House of the Bulgarian Academy of Sciences, Sofia, Bulgaria, pp. 318-332, 1978.
- Conger, B. V. and J. V. Carabia. Proportions of 2C and 4C Nuclei in the Root and Shoot of Dormant and Germinated Embryos of *Festuca arundinacea* and *Dactylis glomerata*. *Environmental and Experimental Botany* 18:55-59, 1978.

- Conger, B. V., J. V. Carabia, and K. W. Lowe. Comparison of 2, 4-d and 2,4, 5-T on Callus Induction and Growth in Three *Gramineae* Species. *Environmental and Experimental Botany* 18:163-168, 1978.
- Fribourg, H. A. and D. L. Ingram. Probability of Low and High Temperatures in Tennessee. National Oceanic and Atmospheric Administration Technical Memo EDS 23, 1978.
- Fribourg, H. A., L. S. Jeffery, J. R. Evans, J. W. High, Jr., D. D. Howard, and H. Morgan, Jr. Clover Establishment in Fescue Sods Following Renovation with Disking and Herbicides. *Tennessee Farm and Home Science* No. 105, March 1978.
- Fribourg, H. A. Tall Fescue Productivity After Renovation with Legumes or Fertilization with Nitrogen. *Tennessee Farm and Home Science* No. 107, September 1978.
- Fribourg, H. A. and R. W. Loveland. Seasonal Production, Perloine Content, and Quality of Fescue after N Fertilization. *Agronomy Journal* 70:741-745, 1978.
- Fribourg, H. A. and R. W. Loveland. Production, Digestibility, and Perloine Content of Fescue Stockpiled and Harvested at Different Seasons. *Agronomy Journal* 70:745-747, 1978.
- Graves, Charles R. Performance of Field Crop Varieties. *Tennessee Agricultural Experiment Station Bulletin* 572, 1977.
- Graves, Charles R., J. R. Overton, and J. H. Morgan. Soybean-Variety-/Date of Planting Study/ from 1974-76. *Tennessee Agricultural Experiment Station Bulletin* 582, 1978.
- Graves, Charles R., T. McCutchen, and L. Safley. Double Cropping Systems Using Soybeans or Grain Sorghum and Wheat. *Tennessee Farm and Home Science* No. 106, June 1978.
- Graves, Charles R., T. McCutchen, and R. Freeland. Soybean Varieties Response to Potassium. *Tennessee Farm and Home Science* No. 105, March 1978.
- Graves, Charles R. and T. McCutchen. Soybean Variety Date of Planting Study at Milan from 1974-76. *Tennessee Farm and Home Science* No. 105, March 1978.
- Graves, Charles R. and T. McCutchen. Wheat Following Corn or Soybeans. *Tennessee Farm and Home Science* No. 106, June 1978.
- Graves, Charles R. Do a Good Job on Corn. *Tennessee Farmer Magazine*, February 1978.
- Haebeler, A. F., B. C. Nichols, and O. T. Chortyk. Effects of Application Rates on Maleichydrazide Residues in Burley Tobacco. *Journal of Agricultural and Food Chemistry* 26(2):385-388, 1978.
- Halluin, J. M., J. H. Turner, and P. E. Hoskinson. Comparisons of Seed and Fiber Properties and Yield of Glanded and Glandless Cottons. *Crop Science* 17: 519-520, 1978.
- Harville, B. G., L. M. Josephson, and H. C. Kincer. Dialles Analysis of Ear Height and Associated Characters in Corn. *Crop Science* 18:273-275, 1978.

- Jackson, A. W., L. S. Jeffery, and T. C. McCutchen. Tolerance of Soybeans (*Glycine max*) and Grain Sorghum (*Sorghum bicolor*) to Floumeturon Residue. Weed Science 26:454-458, 1978.
- Jeffery, Larry S., H. A. Fribourg, J. R. Evans, D. D. Howard, J. W. High, Jr., and H. Morgan, Jr. Suppression of Tall Fescue Sodds with Disking and Herbicides for Pasture Renovation. Tennessee Farm and Home Science No. 105, March 1978.
- Josephson, L. M. and F. Berggren. Producing White Corn for the Milling Industry. Tennessee Agricultural Experiment Station Special Report 1, 1978.
- Josephson, L. M., C. R. Graves, and H. C. Kincer. Performance of Corn Hybrids Grown Under Virus Disease Conditions. Tennessee Farm and Home Science No. 105, March 1978.
- Krueger, W. A., J. R. Overton, and T. C. McCutchen. The Effect of Dinoseb as a Growth Regulator on the Yield of Corn. Tennessee Farm and Home Science No. 106, June 1978.
- Lewis, R. J. Cation Exchange Capacity. Chapter 9 in Analyses of Clay, Silt, and Sand Fractions of Selected Soils from Southeastern United States. Southern Cooperative Series Bulletin 219, 1978. Edited by R. I. Barnhisel.
- Lillehoj, E. B., et al (L. M. Josephson). Aflatoxin Contamination of Corn before Harvest: *Aspergillus flavus* Association with Insects Collected from Developing Ears. Crop Science 18, 1978.
- Lockwood, D. W. and D. Sparks. Translocation of ^{14}C in 'Stuart' Pecan in the Spring Following Assimilation of $^{14}\text{CO}_2$ during the Previous Growing Season. Journal of the American Society of Horticultural Science 103:38-45, 1978.
- Lockwood, D. W. and D. Sparks. Translocation of ^{14}C from Tops and Roots of Pecan in the Spring Following Assimilation of $^{14}\text{CO}_2$ during the Previous Growing Season. Journal of the American Society of Horticultural Science 103:45-49, 1978.
- Mullins, Charles A. Performance of Four Malling and Five Malling Merton Apple Rootstocks in Tennessee. Compact Fruit Tree 11:112-115, 1978.
- Mullins, Charles A. Performance of Eight Promising New Apple Varieties on the Cumberland Plateau of Tennessee. Compact Fruit Tree 11:127-129, 1978.
- Mullins, Charles A. and Homer D. Swingle. Snap Bean Herbicide Trials. Tennessee Farm and Home Science No. 106, June 1978.
- Mullins, Charles A., D. L. Coffey, and D. W. Lockwood. Chemical Weed Control in Vineyards. Tennessee Farm and Home Science No. 108, December 1978.
- Naidoo, G., J. McD. Stewart, and R. J. Lewis. Accumulation Sites of Al in Snapbean and Cotton Roots. Agronomy Journal 70:489-492, 1978.
- Overton, Joseph R., L. S. Jeffery, and H. Morgan, Jr. Response of Soybeans to Delayed Planting after Double Rates of Dinitroaniline Herbicides. Tennessee Farm and Home Science No. 108, December 1978.
- Overton, Joseph R. and John A. Reynolds. Orchardgrass Varieties at Jackson and Knoxville. Tennessee Farm and Home Science No. 107, September 1978.

- Payne, J. A., H. C. Ellis, and D. W. Lockwood. Biology and Distribution of the Pecan Weevil in Georgia and Tennessee. Proceedings: Georgia Pecan Growers Association 9:82-89, 1978.
- Parks, W. L. and Steve Livingston. Soybeans, Sunlight and Yield. Better Crops with Plant Food, pp. 8-10, 1978.
- Parks, W. L., John Connell, Reid Evans, Tom McCutchen, and Lawson Safley. Hill Drop Soybeans. Tennessee Farm and Home Science No. 105, March 1978.
- Parks, W. L., Joseph R. Overton, and Charles R. Graves. Cotton Irrigation. Tennessee Agricultural Experiment Station Bulletin 581, 1978.
- Reasons, D. L., L. S. Jeffery, and T. C. McCutchen. Soybean (*Glycine max*) and Grain Sorghum (*Sorghum bicolor*) Tolerance to Residues of Tetrafluron and Fluometuron. Weed Science 26:533-538, 1978.
- Reynolds, John H. Protein Yield of Soybean Vegetation and Beans. Tennessee Farm and Home Science No. 107, September 1978.
- Rowell, Brent, David L. Coffey, Charles A. Mullins, and Thomas Cordrey. Maintenance of Soil Fertility for Vegetable Crops. Tennessee Farm and Home Science No. 108, December 1978.
- Skold, L. N. Tolerance of Minor Cereals to Suboptimal Land Conditions. In G. A. Jung (ed.) Crop Tolerance to Suboptimal Land Conditions. American Society of Agronomy, Madison, Wisconsin, 1978.
- Springer, M. E., F. DeConinck, E. Van Ranst, R. Tavernier, and P. Pahaut. Mineralogy of Dystrochrepts in the Belgian Ardennes. International Congress of Soil Science Abstracts, 11th (Edmonton, Ontario) 7:120, 1978.
- Stewart, J. McD. Ammonium and Ag⁺ Influence Ethephon Induced Callus on Cotton Ovules. Proceedings: Beltwide Cotton Production Conference p. 39, 1978.
- Stewart, J. McD. and Cecilia L. Hsu. Interspecific *Gossypium* Hybrids through Ovule Culture. Proceedings: Beltwide Cotton Production Conference p. 68, 1978.
- Stewart, J. McD. and Cecilia L. Hsu. Hybridization of Diploid and Tetraploid Cottons through In-ovulo Embryo Culture. Journal of Heredity 69, 1978.
- Turner, John H., Jr., and Harmon H. Ramey, Jr. Relationship of Variety Test and Grower Yield Level. Proceedings: Beltwide Cotton Research conference, 1978.

TEXTILES AND CLOTHING

Proj. No.	Research Project Title
Hatch 485	Selected Factors Affecting the Consumer Use Performance of Flame Retardant Fabrics (contributing to Regional Proj. S-109).

Bulletins, Articles, and Reports—1978

Treece, A. J., I. R. Hardin, R. L. Galbraith, S. H. Zeronian, E. L. Finley, and P. E. Keney. Performance of Selected Fabrics Treated with Flame-Retardant Finishes. Southern Cooperative Series No. 232, December 1978.

STATION PERSONNEL—1978

The University of Tennessee
Agricultural Experiment Station
Knoxville, Tennessee 37901

AGRICULTURAL COMMITTEE**Board of Trustees**

Edward J. Boling, President of the University
Clyde M. York, Chairman Ben Douglass, Vice Chairman
Wayne Fisher, Harry W. Laughlin, Don O. Shadow
Edward S. Porter, Commissioner of Agriculture

STATION OFFICERS**Administration**

Edward J. Boling, President
Webster Pendergrass, Vice President for Agriculture
B. H. Pentecost, Assistant Vice President
D. M. Gossett, Dean
T. J. Whatley, Associate Dean
J. I. Sewell, Assistant Dean
O. Clinton Shelby, Director of Business Affairs
Ed J. Fiegle, Accountant
G. W. F. Cavender, Director, Office of Communications
William L. Sanders, Statistician

MAIN STATION, KNOXVILLE

John Hodges III, Superintendent of Farms

BRANCH STATIONS

Dairy Experiment Station,¹
Lewisburg, J. R. Owen,¹
Superintendent

Highland Rim Experiment Station,
Springfield, L. M. Safley,
Superintendent

Plateau Experiment Station,
R. D. Freeland, Superintendent,
R. Q. Snider, Manager
Tobacco Experiment Station,¹
Greeneville, Donald D. Howard,
Superintendent

¹In cooperation with the U. S. Department of Agriculture.

Middle Tennessee Experiment Station,
Spring Hill, J. W. High, Jr.,
Superintendent

West Tennessee Experiment Station,
Jackson, J. F. Brown,
Superintendent

FIELD STATIONS

Ames Plantation, Grand Junction,
James M. Bryan, Superintendent;
James M. Anderson, Associate
Superintendent

Forestry Field Stations at Tullahoma,

Wartburg, and Oak Ridge,
Richard M. Evans, Superin-
tendent

Milan Field Station, Milan, T. C.
McCutchen, Superintendent

AGRICULTURAL BIOLOGY

Carroll J. Southards, Professor and
Head of Department

Ernest C. Bernard, Assistant Professor

Albert Y. Chambers, Associate
Professor, Jackson

James M. Epps, Associate Professor,
Jackson¹

Reid R. Gerhardt, Associate Professor

Paul Goodfellow, Graduate Research
Assistant

James W. Hilty, Professor

Phil P. Hunter, Assistant Professor,
Springfield

C. Dayton Hylton, Graduate Research
Assistant

George K. Jeffers, Graduate Research
Assistant

Pedro R. Jones, Graduate Research
Assistant

Leander F. Johnson, Professor

Lyle E. Klostermeyer, Assistant
Professor

Paris L. Lambdin, Associate Professor

Gary L. Lentz, Assistant Professor,
Jackson

Raymond E. McNew, Graduate
Research Assistant

Wayne M. Millington, Graduate
Research Assistant

Bradley Mullens, Graduate Research
Assistant

Raymond A. Nabors, Graduate
Research Assistant

Charles D. Pless, Associate Professor

Teresa Ragain, Graduate Research
Assistant

Howard E. Reed, Associate Professor

Nabil B. Shamiyeh, Research Associate

Lynn J. Snodderly, Graduate Research
Assistant

Nancy J. Taylor, Pesticide Assessment
Coordinator

J. Keith Watson, Graduate Research
Assistant

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

J. A. Martin, Professor and Head of
Department

M. B. Badenhop, Professor

D. J. Bosch, Graduate Research
Assistant

J. R. Brooker, Associate Professor

D. W. Brown, International Professor

J. E. Clark, Graduate Research
Assistant

C. L. Cleland, Professor and
Ombudsman

G. K. Criner, Graduate Research
Assistant

V. P. Culver, Graduate Research
Assistant

C. M. Cuskaden, Associate Professor

Irving Dubov, Professor

J. A. Gillies, Graduate Research Assistant	Assistant
G. F. Graham, Graduate Research Assistant	S. D. Mundy, Associate Professor
M. D. Gray, Research Associate	Olunfunmilayo F. Omowale, Graduate Research Assistant
D. L. Hunter, Graduate Research Assistant	R. H. Orr, Assistant Professor
Ruth C. Johnson, Graduate Research Assistant	R. M. Ray, Associate Professor
L. H. Keller, Professor	C. B. Sappington, Professor
T. H. Klindt, Associate Professor	C. R. Seigrist, Graduate Research Assistant
M. R. Landes, Research Associate	F. J. Spinelli, Graduate Research Assistant
D. J. Leuck, Graduate Research Assistant	R. W. Todd, Associate Professor
F. O. Leuthold, Professor	B. J. Trevena, Associate Professor
D. L. McLemore, Associate Professor	Deborah K. Wagner, Graduate Research Assistant
B. R. McManus, Professor	O. N. Walker, Associate Professor
T. S. Moore, Graduate Research Assistant	D. J. Weller, Graduate Research Assistant

AGRICULTURAL ENGINEERING

D. H. Luttrell, Professor and Head of Department	R. S. Krowicki, Assistant Professor ¹
H. O. Vaigneur, Professor and Associate Head of Department	Reba Lawson, Assistant Professor ¹
D. O. Baxter, Assistant Professor	D. M. Merryman, Graduate Research Assistant
J. M. Beckett, Graduate Research Assistant	H. J. Norman, Graduate Research Assistant
B. L. Bledsoe, Professor	K. L. Pierce, Jr., Graduate Research Assistant
R. F. Cullum, Graduate Research Assistant	C. S. Purdum, Graduate Research Assistant
K. E. Duckett, Associate Professor	H. H. Ramey, Jr., Professor ¹
R. S. Guinn, Graduate Research Assistant	L. M. Safley, Jr., Assistant Professor
Z. A. Henry, Associate Professor	S. L. Shoulders, Graduate Research Assistant
P. M. High, Graduate Research Assistant	C. H. Shelton, Associate Professor
M. A. Johnson, Graduate Research Assistant	F. D. Tompkins, Assistant Professor
R. L. Johnson, Architectural Engineer	J. T. Walker, Instructor
	L. R. Wilhelm, Associate Professor
	J. B. Wills, Jr., Assistant Professor

ANIMAL SCIENCE

R. R. Johnson, Professor and Head of Department	B. J. Bearden, Assistant Professor
G. S. Allen, Graduate Research Assistant	M. C. Bell, Professor
W. R. Backus, Associate Professor	R. D. Billingsley, Graduate Research Assistant
J. A. Bacon, Research Associate	W. F. Brown, Graduate Research Assistant
K. M. Barth, Associate Professor	W. T. Butts, Jr., Associate Professor ¹

¹In cooperation with the U. S. Department of Agriculture.

C. C. Chamberlain, Professor	R. R. Lyle, Graduate Research Assistant
C. P. Chihasz, Graduate Research Assistant	J. R. McCurley, Research Associate
C. P. Cieszynski, Graduate Research Assistant	G. C. McGhee, Instructor
Carol Collyer, Graduate Research Assistant	J. B. McLaren, Professor
Donna J. Cox, Graduate Research Assistant	W. W. McNeill, Assistant Professor
J. A. Corrick, Assistant Professor	F. B. Masincupp, Associate Professor
M. C. Crider, Graduate Research Assistant	M. J. Montgomery, Professor
W. T. Damron, Graduate Research Assistant	R. L. Murphree, Professor
M. C. Dixon, Research Associate	G. B. Nutt, Graduate Research Assistant
H. H. Dowlen, Assistant Professor	Carolyn L. Orr, Graduate Research Assistant
C. A. Dugan, Graduate Research Assistant	J. K. Parker, Graduate Research Assistant
H. Eiler, Associate Professor	Nancy Ramsey, Graduate Research Assistant
R. E. Estell, Graduate Research Assistant	R. A. Reynolds, Research Associate
J. T. Fain, Graduate Research Assistant	D. O. Richardson, Professor
R. C. Fudge, Graduate Research Assistant	R. S. Ritter, Graduate Research Assistant
M. E. Fryer, Research Associate	D. Shannon, Graduate Research Assistant
J. P. Hitchcock, Assistant Professor	H. V. Shirley, Professor
J. W. Holloway, Associate Professor	R. R. Shrode, Professor
Barbara B. Innins, Graduate Research Assistant	J. D. Smalling, Assistant Professor
G. E. Jarboe, Research Associate	P. E. Su, Graduate Research Assistant
Kimberly A. Kirnan, Graduate Research Assistant	E. W. Swanson, Professor
E. R. Lidvall, Associate Professor	R. L. Tugwell, Professor
W. A. Lyke, Research Associate	J. V. Wilhite, Graduate Research Assistant
	R. W. Wills, Graduate Research Assistant
	D. R. Wright, Graduate Research Assistant

CHILD AND FAMILY STUDIES

Judith L. Kuipers, Professor and Head of Department

Lois E. Southworth, Assistant Professor

COMMUNICATIONS

G. W. F. Cavender, Director
George C. Mays, Specialist
Conrad A. Reinhardt, Specialist
Frederick E. Berggren, Assistant Specialist

Ronnie W. Haygood, Assistant Specialist
Elaine K. Wiedemann, Assistant Specialist

COMPARATIVE ANIMAL RESEARCH LABORATORY

H. E. Walburg, Laboratory Director
 D. M. Robie, Assistant to the Director
 W. J. Bergfield, Budget Officer
 P. J. Bredderman, Associate Professor
 J. W. Brown, Administrative Assistant
 L. E. Browne, Chief Engineer
 R. J. Chertok, Associate Professor
 G. E. Creswell, Assistant Supervisor
 E. B. Darden, Jr., Professor
 M. S. Edington, Editor
 G. R. Eisele, Assistant Professor
 B. H. Erickson, Professor
 D. E. Foard, Associate Professor
 H. M. Harrington, Post-Doctoral
 Research Associate
 S. L. Hansard, Professor
 R. R. Henke, Assistant Professor
 W. W. Huang, Biostatistician

R. G. Jordan, Systems Analyst
 B. J. Kelman, Assistant Professor
 W. J. Kopp, Professor
 P. G. Martin, Associate Professor
 V. J. McDonald, Jr., Information
 Officer
 A. F. McFee, Professor
 T. R. McFee, Assistant Supervisor
 J. K. Miller, Associate Professor
 F. R. Mraz, Professor
 F. M. Osborne, Purchasing Agent
 F. J. Ryan, Associate Professor
 L. B. Sasser, Associate Professor
 M. D. Schneider, Professor
 G. E. Spalding, Associate Professor
 K. M. Wallace, Health Physicist
 J. F. Weiss, Assistant Professor

FOOD SCIENCE, NUTRITION, AND FOOD SYSTEMS ADMINISTRATION

R. E. Beauchene, Professor and Head
 of Department
 L. A. Acomb, Graduate Research
 Assistant
 R. V. Acuff, Graduate Research
 Assistant
 M. L. Axelson, Graduate Research
 Assistant
 C. W. Bales, Graduate Research
 Assistant
 A. E. Calkins, Graduate Research
 Assistant
 A. M. Campbell, Professor

G. W. Disney, Assistant Professor
 H. G. Huber, Graduate Research
 Assistant
 C. James, Graduate Research Assistant
 V. A. Laiming, Graduate Research
 Assistant
 R. L. Mason, Assistant Professor
 M. P. Penfield, Associate Professor
 J. Skinner, Assistant Professor
 J. T. Smith, Professor
 T. Wakefield, Jr., Graduate Research
 Assistant

FOOD TECHNOLOGY AND SCIENCE

J. T. Miles, Professor and Head of
 Department
 S. L. Cantrell, Graduate Research
 Assistant
 H. N. Carringer, Creamery Manager
 C. B. Claiborne, Graduate Research
 Assistant
 A. B. Cole, Graduate Research
 Assistant

J. L. Collins, Professor
 J. L. Crawford, Graduate Research
 Assistant
 E. E. Cox, Graduate Research Assistant
 G. W. Davis, Assistant Professor
 B. J. Demott, Associate Professor
 M. A. Harrison, Graduate Research
 Assistant

D. A. Hutsell, Graduate Research Assistant	J. R. Mount, Assistant Professor
H. O. Jaynes, Associate Professor	W. W. Overcast, Professor
D. R. Maxedon, Graduate Research Assistant	M. G. Persall, Graduate Research Assistant
C. C. Melton, Associate Professor	O. G. Sanders, Instructor
S. L. Melton, Associate Professor	E. K. Vollmar, Graduate Research Assistant

FORESTRY, WILDLIFE, AND FISHERIES

G. Schneider, Professor and Head of Department	D. M. Ostermeier, Associate Professor (on leave)
J. L. Byford, Associate Professor and Associate Head of Department	M. R. Pelton, Associate Professor
R. C. Abt, Senior Research Assistant	A. L. Platt, Graduate Research Assistant
J. W. Barrett, Professor Emeritus	H. P. Quigley, Graduate Research Assistant
C. C. Brandt, Graduate Research Assistant	J. C. Rennie, Associate Professor
E. R. Buckner, Associate Professor	K. F. Schell, Associate Professor
M. S. Burch, Graduate Research Assistant	J. D. Shannon, Graduate Research Assistant
J. P. Conn, Graduate Research Assistant	E. S. Stogsdill, Graduate Research Assistant
H. A. Core, Professor	J. D. Thomas, Graduate Research Assistant
R. L. Curry, Graduate Research Assistant	E. Thor, Professor
B. L. Dearden, Associate Professor	C. R. Villarrubia, Graduate Research Assistant
R. W. Dimmick, Associate Professor	G. L. Wade, Graduate Research Assistant
C. C. Eagar, Graduate Research Assistant	J. G. Warmbrod, Associate Professor
J. H. Eiler, Graduate Research Assistant	E. E. Watson, Graduate Research Assistant
J. H. Exum, Jr., Graduate Research Assistant	J. C. Watson, Graduate Research Assistant
R. L. Hay, Associate Professor	G. R. Wells, Associate Professor
M. J. Kiningham, Graduate Research Assistant	W. E. Whitworth, Graduate Research Assistant
W. G. Minser III, Research Associate	J. L. Wilson, Associate Professor
W. W. Moschler, Research Associate	F. W. Woods, Professor (on leave)

ORNAMENTAL HORTICULTURE AND LANDSCAPE DESIGN

D. B. Williams, Professor and Head of Department	S. J. McCrary, Graduate Research Assistant
L. M. Callahan, Professor	G. L. McDaniel, Associate Professor
D. S. Cochran, Graduate Research Assistant	S. Tai-An Peng, Graduate Research Assistant
E. T. Graham, Associate Professor	G. S. Smith, Associate Professor
S. Kincaid, Research Associate	H. van de Werken, Associate Professor

PLANT AND SOIL SCIENCE

- L. F. Seatz, Professor and Head of Department
 F. L. Allen, Assistant Professor
 C. D. Banet, Graduate Research Assistant
 F. F. Bell, Professor
 K. W. Bell, Graduate Research Assistant
 G. J. Buntley, Associate Professor
 D. L. Coffey, Associate Professor
 B. V. Conger, Professor
 T. C. Corbin, Graduate Research Assistant
 T. D. Cordrey, Assistant Professor, Jackson
 J. T. Crews, Graduate Research Assistant
 G. E. Day, Graduate Research Assistant
 W. F. Drake, Graduate Research Assistant
 J. R. Evans, Research Assistant
 R. R. Fincher, Graduate Research Assistant
 W. P. Fussell, Graduate Research Assistant
 H. A. Fribourg, Professor
 D. N. Good, Graduate Research Assistant
 C. R. Graves, Associate Professor
 C. L. Gupton¹, Associate Professor, Greeneville
 R. M. Hayes, Assistant Professor, Jackson
 M. J. Hood, Graduate Research Assistant
 J. H. Hope III, Graduate Research Assistant
 P. E. Hoskinson, Associate Professor, Jackson
 L. S. Jeffery, Associate Professor
 L. M. Josephson, Professor
 J. M. Kennedy, Graduate Research Assistant
 H. C. Kincer, Assistant Professor
 W. R. Knight, Graduate Research Assistant
 W. A. Krueger, Associate Professor
 G. M. Lessman, Associate Professor
 R. J. Lewis, Associate Professor
 D. W. Lockwood, Assistant Professor
 J. E. Lothrop, Graduate Research Assistant
 C. D. Manning, Graduate Research Assistant
 C. G. Marshall, Senior Research Technician
 C. A. Mullins, Associate Professor, Crossville
 B. C. Nichols¹, Associate Professor, Greeneville
 J. R. Overton, Associate Professor, Jackson
 W. L. Parks, Professor
 V. H. Reich, Associate Professor
 J. H. Reynolds, Professor
 G. N. Rhodes, Graduate Research Assistant
 R. H. Rogers, Graduate Research Assistant
 D. B. Seaton, Graduate Research Assistant
 R. R. Sharpe, Graduate Research Assistant
 L. N. Skold, Professor
 D. N. Sloan, Senior Research Technician
 H. C. Smith, Associate Professor
 M. E. Springer, Professor
 J. M. Stewart¹, Associate Professor
 H. D. Swingle, Professor
 J. H. Turner¹, Associate Professor
 D. D. Tyler, Assistant Professor, Jackson
 C. L. Viers, Graduate Research Assistant
 W. H. Wall III, Graduate Research Assistant
 S. Worley¹, Associate Professor

TEXTILES AND CLOTHING

- Anna Jean Treece, Professor and Head of Department
 G. Elizabeth Self, Graduate Research Assistant
 Betsy Westlake, Graduate Research Assistant

¹In cooperation with the U. S. Department of Agriculture.

UNIVERSITY OF TENNESSEE AT MARTIN

Harold J. Smith, Dean, School of Agriculture

E. W. Culvahouse, Associate Professor of Dairying

B. N. Duck, Professor of Agronomy

B. R. Hathcock, Assistant Professor of Agronomy

Harry A. Henderson, Farm Manager

N. W. Robinson, Professor of Animal Science

PERSONNEL CHANGES

Appointments

Robert C. Abt, Senior Research Assistant in Forestry, Wildlife, and Fisheries, June 12, 1978

L. A. Acomb, Graduate Research Assistant in Food Science, Nutrition and Food Systems Administration, September 1, 1978

Gregory S. Allen, Graduate Research Assistant in Animal Science, September 21, 1978

Christopher D. Banet, Graduate Research Assistant in Plant and Soil Science, September 18, 1978

Stephen M. Bank, Graduate Research Assistant in Plant and Soil Science, July 1, 1978

Nancy G. Bartley, Graduate Research Assistant in Agricultural Biology, January 1, 1978

J. M. Beckett, Graduate Research Assistant in Agricultural Engineering September 18, 1978

Darrell J. Bosch, Graduate Research Assistant in Agricultural Economics, September 13, 1978

Craig C. Brandt, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, January 1, 1978

Mark S. Burch, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, September 15, 1978

A. E. Calkins, Graduate Research Assistant in Food Science, Nutrition and Food Systems Administration, September 1, 1978

Charles P. Chihasz, Graduate Research Assistant in Animal Science, September 18, 1978

Clyde P. Cieszynski, Graduate Research Assistant in Animal Science, September 18, 1978

Cleva B. Claiborne, Graduate Research Assistant in Food Technology and Science, May 1, 1978

David S. Cochran, Graduate Research Assistant in Ornamental Horticulture and Landscape Design, March 20, 1978

Alfred B. Cole, Graduate Research Assistant in Food Technology and Science, June 23, 1978

Carol A. Collyer, Graduate Research Assistant in Animal Science, September 18, 1978

Thomas C. Corbin, Graduate Research Assistant in Plant and Soil Science, September 18, 1978

Donna J. Cox, Graduate Research Assistant in Animal Science, September 1, 1978

Jerry L. Crawford, Graduate Research Assistant in Food Technology and Science, May 1, 1978

George K. Criner, Graduate Research Assistant in Agricultural Economics, January 1, 1978

Robert L. Curry, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, December 1, 1978

Charles A. Dugan, Graduate Research Assistant in Animal Science, September 18, 1978

C. Christopher Eagar, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, November 1, 1978

John H. Eiler, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, September 15, 1978

John R. Evans, Research Assistant in Plant and Soil Science, October 1, 1978

- Joe H. Exum, Jr., Graduate Research Assistant in Forestry, Wildlife, and Fisheries, September 15, 1978
- Raymond C. Fudge, Graduate Research Assistant in Animal Science, August 9, 1978
- Victor L. Fulgoni, Graduate Research Assistant in Animal Science, September 18, 1978
- John A. Gillies, Graduate Research Assistant in Agricultural Economics, January 1, 1978
- Paul J. Goodfellow, Graduate Research Assistant in Agricultural Biology, June 15, 1978
- H. M. Harrington, Post-Doctoral Research Associate, Comparative Animal Research Laboratory, March 20, 1978
- Mark Harrison, Graduate Research Assistant in Food Technology and Science, September 15, 1978
- Robert M. Hayes, Assistant Professor in Plant and Soil Science, January 1, 1978
- Richard B. Henderson, Graduate Research Assistant in Ornamental Horticulture and Landscape Design, September 1, 1978
- Mark J. Hood, Graduate Research Assistant in Plant and Soil Science, September 18, 1978
- Joe H. Hope, III, Graduate Research Assistant in Plant and Soil Science, June 7, 1978
- George K. Jeffers, Graduate Research Assistant in Agricultural Biology, September 11, 1978
- Ruth C. Johnson, Graduate Research Assistant in Agricultural Economics, January 1, 1978
- Susan Kincaid, Research Associate in Ornamental Horticulture and Landscape Design, July 1, 1978
- Michael J. Kiningham, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, September 15, 1978
- Lyle E. Klostermeyer, Assistant Professor in Agricultural Biology, February 13, 1978
- William R. Knight, Graduate Research Assistant in Plant and Soil Science, April 17, 1978
- V. A. Laiming, Graduate Research Assistant in Food Science, Nutrition and Food Systems Administration, September 1, 1978
- James E. Lothrop, Graduate Research Assistant in Plant and Soil Science, September 18, 1978
- Scott J. McCrary, Graduate Research Assistant in Ornamental Horticulture and Landscape Design, June 15, 1978
- John R. McCurley, Research Associate in Animal Science, March 1, 1978
- Raymond E. McNew, Graduate Research Assistant in Agricultural Biology, September 18, 1978
- Curtis G. Marshall, Senior Research Technician in Plant and Soil Science, October 1, 1978
- Don R. Maxedon, Graduate Research Assistant in Food Technology and Science, September 1, 1978
- Wayne M. Millington, Graduate Research Assistant in Agricultural Biology, September 1, 1978
- John R. Mount, Assistant Professor in Food Technology and Science, December 1, 1978
- Raymond A. Nabors, Graduate Research Assistant in Agricultural Biology, June 15, 1978
- Bobby G. Nutt, Graduate Research Assistant in Animal Science, June 12, 1978
- Susan Tai-An Peng, Graduate Research Assistant in Ornamental Horticulture and Landscape Design, January 1, 1978
- Johnny D. Shannon, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, December 1, 1978
- J. Skinner, Assistant Professor in Food Science, Nutrition, and Food Systems Administration, September 1, 1978
- G. Shannon Smith, Associate Professor in Ornamental Horticulture and Landscape Design, January 23, 1978

Lynn J. Snodderly, Graduate Research Assistant in Agricultural Biology, January 4, 1978

Elizabeth S. Stogsdill, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, September 15, 1978

Nancy J. Taylor, Pest Assessment Coordinator, Agricultural Biology, March 1, 1978

Joseph D. Thomas, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, September 15, 1978

Donald D. Tyler, Assistant Professor in Plant and Soil Science, February 1, 1978

Clyde L. Viers, Graduate Research Assistant in Plant and Soil Science, September 18, 1978

Charles R. Villarrubia, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, May 1, 1978

O. Neal Walker, Associate Professor in

Agricultural Economics, November 1, 1978

William H. Wall, III, Graduate Research Assistant in Plant and Soil Science, September 18, 1978

James C. Watson, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, March 27, 1978

Betsy Westlake, Graduate Research Assistant in Textiles and Clothing, September 1, 1978

Wilbur E. Whitworth, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, December 1, 1978

Jerry V. Wilhite, Graduate Research Assistant in Animal Science, September 18, 1978

Robert W. Willis, Graduate Research Assistant in Animal Science, August 7, 1978

Danny R. Wright, Graduate Research Assistant in Animal Science, September 18, 1978

Terminations

A. A. Allen, Graduate Research Assistant in Food Science, Nutrition and Food Systems Administration, August 31, 1978

Stephen M. Bank, Graduate Research Assistant in Plant and Soil Science, September 30, 1978

Nancy G. Bartley, Graduate Research Assistant in Agricultural Biology, November 15, 1978

B. F. Beaty, Graduate Research Assistant in Food Technology and Science, September 16, 1978

Cecillia Bensing, Graduate Research Assistant in Animal Science, December 31, 1978

Susan Bentley, Graduate Research Assistant in Animal Science, December 8, 1978

J. Karl Bletner, Professor of Animal Science, June 30, 1978

P. L. Brady, Graduate Research Assistant in Food Science, Nutrition, and Food Systems Administration, August 31, 1978

M. L. Brown, Graduate Research Assistant in Food Technology and Science, June 1, 1978

C. R. Calkins, Graduate Research Assistant in Food Technology and Science, September 1, 1978

C. G. Clemen, Graduate Research Assistant in Food Technology and Science, September 1, 1978

Rodney J. Creel, Graduate Research Assistant in Plant and Soil Science, August 31, 1978

S. D. Cunningham, Assistant Professor in Food Technology and Science, September 16, 1978

Charles T. Cunyningham, Graduate Research Assistant in Plant and Soil Science, May 31, 1978

- Brady J. Deaton, Associate Professor
in Agricultural Economics,
July 31, 1978
- Glenda B. Denton, Graduate Research
Assistant in Agricultural Economics,
November 23, 1978
- Harry P. Denton, Graduate Research
Assistant in Plant and Soil Science,
August 31, 1978
- John M. Devine, Instructor in
Agricultural Economics,
December 2, 1978
- Douglas F. Ellis, Graduate Research
Assistant in Animal Science,
September 20, 1978
- Richard E. Fish, Graduate Research
Assistant in Animal Science,
September 20, 1978
- Frank T. Garden, Graduate Research
Assistant in Agricultural Biology,
August 25, 1978
- Don Gardner, Graduate Research
Assistant in Agricultural Biology,
June 2, 1978
- David L. Garshelis, Graduate Research
Assistant in Forestry, Wildlife, and
Fisheries, August 31, 1978
- Nickey S. Hall, Graduate Research
Assistant in Animal Science,
June 10, 1978
- Michael T. Hanna, Graduate Research
Assistant in Agricultural Economics,
August 31, 1978
- J. L. Harris, Graduate Research
Assistant in Food Science,
Nutrition, and Food Systems
Administration, August 31, 1978
- Lynda R. Haynes, Graduate Research
Assistant in Forestry, Wildlife, and
Fisheries, December 31, 1978
- Richard B. Henderson, Graduate
Research Assistant in Ornamental
Horticulture and Landscape Design,
November 30, 1978
- Robert H. Hicks, Graduate Research
Assistant in Plant and Soil Science,
April 30, 1978
- Joe Hope III, Graduate Research
Assistant in Agricultural Biology,
June 6, 1978
- Gary H. Irwin, Graduate Research
Assistant in Forestry, Wildlife, and
Fisheries, December 31, 1978
- Kenneth G. Johnson, Graduate
Research Assistant in Forestry,
Wildlife, and Fisheries,
September 15, 1978
- M. A. Johnson, Graduate Research
Assistant in Agricultural
Engineering, December 31, 1978
- D. W. Jones, Graduate Research
Assistant in Agricultural
Engineering, June 30, 1978
- Ellen Kaplon, Graduate Research
Assistant in Animal Science,
August 31, 1978
- Susan Kincaid, Graduate Research
Assistant in Ornamental
Horticulture and Landscape Design,
June 30, 1978
- Karen W. Lowe, Graduate Research
Assistant in Plant and Soil Science,
August 31, 1978
- David R. McCarroll, Graduate
Research Assistant in Forestry,
Wildlife, and Fisheries,
May 31, 1978
- William A. McRae, Graduate Research
Assistant in Forestry, Wildlife, and
Fisheries, September 15, 1978
- Robert C. May, Graduate Research
Assistant in Forestry, Wildlife, and
Fisheries, June 30, 1978
- Mitzi G. Miller, Research Assistant in
Ornamental Horticulture and
Landscape Design, May 30, 1978
- Robert F. Montgomery, Graduate
Research Assistant in Animal
Science, August 31, 1978
- Ernest L. Moody, Research Assistant
in Animal Science, June 9, 1978
- Joe E. Moore, Graduate Research
Assistant in Plant and Soil Science,
September 30, 1978
- Sheila M. Moore, Graduate Research
Assistant in Agricultural Biology,
June 6, 1978
- Roger A. Munsinger, Instructor in
Animal Science, April 28, 1978

- Greg Noel, Assistant Professor of Agricultural Biology, USDA, Jackson, June 30, 1978
- C. S. Purdum, Graduate Research Assistant in Agricultural Engineering, December 31, 1978
- Thomas H. Roberts, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, August 31, 1978
- Joseph P. Ross, Graduate Research Assistant in Plant and Soil Science, July 31, 1978
- Albert B. Rowell, Graduate Research Assistant in Plant and Soil Science, March 31, 1978
- Richard A. Schnall, Graduate Research Assistant in Ornamental Horticulture and Landscape Design, July 15, 1978
- James G. Snell, Associate Professor in Agricultural Economics, December 22, 1978
- Elizabeth Sutherland, Graduate Research Assistant in Agricultural Biology, March 3, 1978
- Curtis I. Taylor, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, December 31, 1978
- Stanley W. Telega, Graduate Research Assistant in Animal Science, June 30, 1978
- Beth A. Thompson, Graduate Research Assistant in Textiles and Clothing, August 31, 1978
- Bert F. Viar, III, Graduate Research Assistant in Plant and Soil Science, March 31, 1978
- Harold R. Waddle, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, November 30, 1978
- T. Wakefield, Jr., Graduate Research Assistant in Food Science, Nutrition, and Food Systems Administration, December 31, 1978
- Douglas W. White, Graduate Research Assistant in Forestry, Wildlife, and Fisheries, August 31, 1978

Changes of Titles

- Robert C. Abt, to Senior Research Assistant in Forestry, Wildlife, and Fisheries, June 12, 1978
- James A. Bacon, to Research Associate in Animal Science, July 1, 1978
- R. E. Beauchene, to Head of Food Science, Nutrition, and Food Systems Administration, March 1, 1978
- Lloyd N. Callahan, to Professor of Ornamental Horticulture and Landscape Design, July 1, 1978
- Bob V. Conger to Professor of Plant and Soil Science, July 1, 1978
- Marvis E. Fryer, to Research Associate in Animal Science, July 1, 1978
- Joseph W. Holloway, to Associate Professor of Animal Science, July 1, 1978
- Susan Kincaid, to Research Associate in Ornamental Horticulture and Landscape Design, July 1, 1978
- P. L. Lambdin, to Associate Professor of Agricultural Biology, July 1, 1978
- Maurice R. Landes, to Research Associate in Agricultural Economics January 1, 1978
- Wilfred A. Lyke, to Research Associate in Animal Science, July 1, 1978
- Gary L. McDaniel, to Associate Professor of Ornamental Horticulture and Landscape Design, July 1, 1978
- B. R. McManus, to Professor of Agricultural Economics, July 1, 1978
- M. P. Penfield, to Associate Professor in Food Science, Nutrition, and Food Systems Administration, July 1, 1978
- John H. Reynolds to Professor of Plant and Soil Science, July 1, 1978
- F. J. Ryan, to Associate Professor, Comparative Animal Research Laboratory, July 1, 1978

Charles B. Sappington, to Professor
of Agricultural Economics,
July 1, 1978

L. B. Sasser, to Associate Professor,
Comparative Animal Research
Laboratory, July 1, 1978

Transfers

Marion C. Dixon, from Assistant
Professor, Ames Plantation, to
Research Associate in Animal
Science, July 1, 1978

George E. Jarboe, from Research
Assistant, UT-CARL, to Research

Associate in Animal Science,
October 1, 1978

R. A. Reynolds, from Assistant
Superintendent, Comparative
Animal Research Laboratory, to
Department of Animal Science,
July 1, 1978

Retirements

J. M. Bird, Superintendent
Comparative Animal Research
Laboratory, September 30, 1978

N. S. Hall, Professor of Agricultural

Biology, June 30, 1978

J. O. Mundt, Professor in Food
Technology and Science,
July 1, 1978

On Leave

D. M. Ostermeier, Associate Professor,
Forestry, Wildlife, and Fisheries,
September 15, 1978

F. W. Woods, Professor, Forestry,
Wildlife, and Fisheries,
October 5, 1978

Deceased

Newman I. Hancock, Professor
(Emeritus) of Plant and Soil
Science, March 13, 1978

James S. Kring, Retired Manager,
Forestry, Wildlife, and Fisheries,

January 18, 1978

Helen M. Reed, Assistant Professor,
Child and Family Studies,
August 16, 1978