

Annual Report
of the
Arizona
Agricultural Experiment Station

FOR THE 66TH YEAR
ENDING JUNE 30, 1955



AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF ARIZONA, TUCSON

Printed February 1956
1M Betts Printing Co., Tucson

ORGANIZATION

Board of Regents of the University and State Colleges of Arizona

ERNEST W. MCFARLAND (ex officio), A.B., M.A., J.D., LL.D.
Governor of Arizona
CLIFTON L. HARKINS (ex officio), B.S., M.A.
State Supt. of Public Instruction

JOHN G. BABBITT, B.S.....Term expires January, 1957
MICHAEL B. HODGES, President.....Term expires January, 1957
JOHN M. JACOBS, Secretary.....Term expires January, 1959
EVELYN JONES KIRMSE, A.B., A.M.....Term expires January, 1959
ALEXANDER G. JACOME, B.S., Treasurer.....Term expires January, 1961
WILLIAM R. MATHEWS, A.B.....Term expires January, 1961
LYNN M. LANEY, B.S., J.D.....Term expires January, 1963
SAMUEL H. MORRIS, A.B., J.D., LL.D.....Term expires January, 1963

RICHARD A. HARVILL, Ph.D.....President of the University
ROBERT L. NUGENT, Ph.D.....Vice-President of the University

Experiment Station Administration

RALPH S. HAWKINS, Ph.D.....Acting Director
ARLAND R. MEADE, B.S., M.S.....Editor

This report is limited to an inventory of active research projects, an enumeration of publications issued during the year, a roll of staff members, and an account of receipts and disbursements of federal and state funds. The results of completed investigations are published in general and technical bulletins, reports, and in technical journals. Reports of research progress, digests of general and technical bulletins, and developments not associated with specific projects are carried in *Progressive Agriculture in Arizona*, a quarterly publication of the College of Agriculture, University of Arizona.

AGRICULTURAL EXPERIMENT STATION

I. ACTIVE PROJECTS

AGRICULTURAL BIOCHEMISTRY

Nutritive value of certain Arizona-produced foods and feeds and their relationship to various factors (Purnell 258A and C, and State).

The interdependence and physiological availability of amino acids, vitamins and other nutrients in foods (Bankhead-Jones (9b1,2) 271 and State).

Nutritional status and dietary needs of population groups in selected areas of the West (Bankhead-Jones (9b3) 313-2 and State).

Amino acid metabolism in rheumatoid arthritis (U.S. Public Health Service H-490 (C-3)).

AGRICULTURAL CHEMISTRY AND SOILS

Lysimeter study of the nitrogen balance in irrigated arid soils (Purnell 169 and State).

Nutritional, chemical and physical studies on the more important soil types in Arizona (Purnell 265 and State).

Fertilization of field crops on alkaline calcareous soils of different types under semiarid and irrigated conditions (Bankhead-Jones (9b1,2) 266 and State).

Availability of native soil phosphate and new commercial phosphate fertilizers in Arizona calcareous soils (Purnell 280, Atomic Energy Commission and State).

Fundamental soil studies on the properties and uses of soil correctives (Purnell 281 and State).

Nature of microflora and their activity in Arizona soils as affected by soil temperature, moisture, salinity, pH, and other factors peculiar to semiarid soils (Purnell 283 and State).

Study of the effect of temperature variation on various chemical and physical soil properties which affect fertility (Purnell 289 and State).

Soil plant system with reference to availability and uptake of moisture and ions (State 307).

Soil structure as affected by soil amendments (Bankhead-Jones (9b3) 369 and State).

Uptake of strontium by crops (Atomic Energy Commission and State).

Study of soil aggregate stabilizers (Monsanto Chemical Company and State).

Weather records (State 160).

Control laws — Fertilizer, Feed, Economic Poisons, Agricultural Minerals (State).

Soil survey (State 326).

Analytical laboratory service (State).

AGRICULTURAL ECONOMICS

Supply-price relationships and trends as they apply to Arizona farm and ranch products (Bankhead-Jones (5) 196 and State).

Relationship between the price received by farmers at gin points and the quality of cotton — Central Arizona (Bankhead-Jones (9b3) 267 and State).

Agricultural credit facilities in Arizona: An analysis of existing structure and problem areas (Bankhead-Jones (5) 312 and State).

Marketing Arizona head lettuce with special reference to packaging and cooling methods and to the possibilities of market control programs (Bankhead-Jones (9b1,2,3) 316 and State).

Marketing livestock from Arizona ranches and feedlots (Bankhead-Jones (9b1,2) 319, 319A, and State).

Quality and cost of ginning services in central Arizona (Bankhead-Jones (9b1,2) 321 and State).

Consumer acceptance of beef (Title II, 373 and State).

AGRICULTURAL ENGINEERING

Groundwater studies (Adams 1 and State).

Water-supply forecasting and needed areal adjustments in irrigated agriculture during drouths (Hatch 215 and State).

The production and utilization of tamarisk, *Tamarix Articulata* (Purnell 231 and State).

Mechanization of cotton production and harvesting (Bankhead-Jones (9b1,2,3) 269 and State).

Sprinkler irrigation studies under arid Southwestern conditions (Adams 303 and State).

Hydrology and water utilization of small drainage areas on the valley slopes in southern Arizona (Bankhead-Jones (9b1,2) 375 and State).

AGRONOMY AND RANGE MANAGEMENT

Range resources of Arizona (Purnell 232 and State).

Influence of forage harvesting and feeding methods on beef production (Bankhead-Jones (5) 248 and State).

Control of weeds on irrigated lands (Bankhead-Jones (5) 261 and State).

Cotton production under irrigation (Purnell 264 and State).

Mechanization of cotton production and harvesting (Bankhead-Jones (9b1,2,3) 269 and State).

Production and improvement of oil seed crops (Purnell 275 and State).

Control of noxious shrubs on southwestern ranges (Bankhead-Jones (9b1,2) 285 and State).

Factors affecting the noxious shrub control program on Arizona rangelands (Bankhead-Jones (5) 292 and State).

Seed production of forage plants (Purnell 304 and State).

The culture and improvement of cereals (Bankhead-Jones (9b1,2) 305 and State).

Changes in the desert grassland — An analysis of causes (Bankhead-Jones (9b3) 365 and State).

Control of noxious plants — Period of maximum susceptibility (Bankhead-Jones (9b3) 366 and State).

Effect of physiological and environmental factors on alfalfa seed production (Bankhead-Jones (9b3) 367 and State).

Seed increase and preliminary evaluation of plant introductions that may be suited to the Southwest (Bankhead-Jones (9b3) 368 and State).

Poisonous plants of Arizona (State 328).

Asphalt paved runoff basins as a source of stockwater on semiarid ranges (Arizona Game & Fish Commission and State 340).

Alfalfa improvement (State 341).

Grain sorghums (State 342).

ANIMAL HUSBANDRY

Nutritional studies of Arizona range plants and animals (Purnell 183 and State).

Influence of forage harvesting and feeding methods on beef production (Bankhead-Jones (5) 248 and State).

Progeny testing of Hereford sires (Bankhead-Jones (9b1,2,3) 279 and State).

Investigation of an achondroplasia-like condition in Hereford cattle (Purnell 282 and State).

ANIMAL PATHOLOGY

Range livestock losses from poisonous plants (Purnell 171 and State).

Infectious keratitis in cattle on range and feed lots (Purnell 199 and State).

Investigation of cattle death losses occurring on alfalfa, alfalfa-barley and barley pastures (Purnell 217 and State).

Effect of rumen organisms on growth of calves (State 325).

Abortion in range cattle (State 338).

Diagnostic laboratory service (State 339)

The incidence of leptospirosis in domestic animals in Arizona (Department of Health, Education and Welfare and State).

Study of coccidioidomycosis in animals (Department of Health, Education and Welfare and State).

BOTANY

Nutritional requirements for increased fat production by selected crop plants (Purnell 250 and State).

University of Arizona herbarium (State 327).

Weeds of Arizona (State 331).

Uranium accumulation in plants as an indicator of uranium deposits in the soil (Atomic Energy Commission and State).

Synthesis of fatty acids in a higher plant (Atomic Energy Commission and State).

Biosynthesis of waxes by higher plants (Johnson & Son, Inc. and State).

Leaf anatomy of *Prosopis juliflora* (U.S. Forest Service and State).

DAIRY HUSBANDRY

Some factors related to oxidation reactions in milk, milk products and milk constituents (Bankhead-Jones (5) 320 and State).

Effect of feeding rendered animal fat on milk production and milk composition (Purnell 376 and State).

Pellets made from dehydrated immature alfalfa as a supplement feed for milk production (Hatch 377 and State).

ENTOMOLOGY

Insect pests of Arizona vegetable crops (Purnell 257 and State).

Insect vectors of plant diseases affecting Arizona crops (Hatch 301 and State).

Arizona insects of economic importance (Purnell 302 and State).

Insects and mites affecting alfalfa in Arizona (Hatch 322 and State).

HOME ECONOMICS

Space requirements for activities and storage for the care of infants and young children (Bankhead-Jones (9b3) 323 and State).

Effect of warm climate on basal metabolism and blood saturation levels of ascorbic acid (Bankhead-Jones (9b1,2) 370 and State).

HORTICULTURE

Improvement of pecan production and quality in Arizona (Purnell 262 and State).

Date maturation, storage and quality (Bankhead-Jones (9b1,2) 270 and State).

Breeding and improvement of melon varieties (Purnell 295 and State).

Factors affecting the quality of Arizona melons (Purnell 296 and State).

Lettuce breeding in Arizona (Purnell 297 and State).

Cultural factors affecting the production of Arizona lettuce (Purnell 298 and State).

Factors affecting the production of citrus in Arizona (Purnell 299 and State).

Factors affecting the shipping quality and consumer acceptability of Arizona-grown vegetables (Bankhead-Jones (9b1,2) 308 and State).

Soil moisture movement factors in the root zone of crop plants and evaporational effects (Bankhead-Jones (9b1,2) 371 and State).

Control of weeds in lettuce and cantaloupes (Bankhead-Jones (9b1,2) 374 and State).

Cardinal grape quality improvement (State 343).

Deciduous fruit varieties (State 344).

Vegetable variety testing (State 345).

Vegetable breeding (State 346).

Vegetable culture testing (State 347).

Improving irrigated turfs in Arizona (State 348).

Propagation of horticultural materials (State 349).

Introduction of landscaping materials (State 350).

Nursery management investigations (State 351).

Growth regulators for landscaping materials (State 352).
Temperature relations in horticulture (State 353).
Industry developments in horticulture (State 354).

PLANT BREEDING

Study of variability in adapted commercial alfalfa varieties and methods for their improvement (Adams 4 and State).

Study of the inheritance of fiber qualities in selfed lines of hybrids of Upland cottons (Adams 47 and State).

Breeding cotton for disease and insect resistance and for plant types suitable for mechanical harvesting (Bankhead-Jones (9b1,2) 278 and State).

Breeding long staple cotton (*Gossypium barbadense*) for length, fineness and strength of fiber and improved type of plant with high production (Adams 294 and State).

Breeding sorghums for increased uniformity in the field and for improved agronomic characteristics and increased production of grain and forage (Bankhead-Jones (5) 309 and State).

PLANT PATHOLOGY

Control of phymatotrichum (Cotton or Texas) root rot on irrigated lands (Adams 42 and State).

Control of dry root rot and other root diseases of citrus (Purnell 222 and State).

Development of wilt-resistant alfalfa varieties adapted to Arizona (Adams 227 and State).

Verticillium wilt of cotton (Adams 256 and State).

Virus diseases of vegetable crops, including melons, in Arizona (Bankhead-Jones (9b1,2) 286 and State).

The control of drop or watery brown rot (Sclerotiniosis) in lettuce and other vegetables through the use of "Aero" calcium cyanamide (American Cyanamid Company and State).

Cause and control of cantaloupe crown blight (State 317).

Cause and control of lettuce rib discoloration (State 318).

Control of flax wilt (State 355).

Lettuce rosette (State 357).

Fusarium oxysporum f. *niveum* is seed borne (State 358).

Antibiotics in relation to plant disease control (State 359).

Diagnoses of plant diseases (State 360).

Diseases of *Lippia* new to Arizona (State 361).

Diseases of grasses in Arizona (State 378).

Cytophora canker of Eucalyptus (State 379).

POULTRY HUSBANDRY

Establishing a heat-resistant strain of white leghorns (Hatch 363 and State).

Utilization of Arizona crops in chick diets (Purnell 364 and State).

Poultry feeding (State 90).

II. PUBLICATIONS

GENERAL BULLETINS

- 259 Costs of Harvesting Upland Cotton in Arizona, by Andrew Vanvig and James S. St. Clair.
 260 Small Grains in Southern Arizona, by H. P. Cords and A. D. Day.
 261 Arizona Agriculture in 1955, by George W. Barr.
 262 Agricultural Credit in Arizona, by Andrew Vanvig.
 263 Chemical Control of Annual Morning Glory and Annual Grasses in Cotton, by H. Fred Arle and E. H. Everson.

REPORTS

- 114 Small Grain Varieties for Arizona, by Arden D. Day.
 115 Malathion for the Control of Pests of Ornamentals in Southern Arizona: a Progress Report. By George D. Butler, Jr.
 116 Tissue Analysis as an Index of the Nutritional Status of Arizona Vineyards, by W. T. McGeorge and E. L. Breazeale.
 117 Nutrient Requirements of Arizona Cotton, by J. L. Abbott, W. T. McGeorge, and E. L. Breazeale.
 118 Indoor Dining Areas for Rural Homes in the Western Region, by B. Eleanor Johnson and Elizabeth Hurley.

TECHNICAL ARTICLES IN JOURNALS

- Anderson, R. Y., and Kurtz, E. B. Factors influencing uranium accumulation in plants. *Bul. Geol. Soc. of America*. 65:1226. 1954 (an abstract).
 Biochemical reconnaissance of the Annie Laurie uranium prospect, Santa Cruz County, Arizona. *Econ. Geol.* 50:227-232. 1955.
 Anderson, R. Y. (See under Kurtz)
 Burkhart, L. (See under Sharples)
 Butler, George D., Jr. The effect of alfalfa irrigation treatments on the two-spotted spider mite in alfalfa. *Jour. Econ. Ent.* 482:221-222. 1955.
 (By Hottes, F. C. and Butler, G. D., Jr.) A new species of *Cinara* from Arizona. *Proc. of the Biol. Soc. of Wash.* 68:65-66. 1955.
 (See under Tuttle)
 Carruth, L. A. (See under Hopkins)
 Day, A. D., Down, E. E., and Frey, K. J. Association between diastatic power and certain visible characteristics and heritability of diastatic power in barley. *Agron. Jour.* 47:163-165. 1955.
 Fuller, W. H., and Gairard, Catherine. The influence of soil aggregate stabilizers on the biological activity of soil. *Soil Sci. Soc. Amer. Proc.* 18:35-40. 1954.
 Fuller, W. H., Shannon, S., and Burgess, P. S. Effect of burning on certain forest soils in northern Arizona. *Forest Sci.* Vol. I: (1) 44-50. 1955.

- Hillman, J. S. Impact in problems in administration of export programs. *The Jour. of Farm Econ.*, Vol. XXXVII, No. 4. 1955.
- The compatibility of soft-currency sales of farm surpluses and free multilateral trade. *The Proceedings Issue of the Western Farm Econ. Assoc.* 27th annual meeting. 1954.
- Hillman, J. S. and Randall, C. B. A review of the book "A Foreign Economic Policy for the United States." *The Jour. of Farm Econ.* Vol. XXXVII, No. 2. 1955.
- Hopkins, L. Biology and control of *Polistes exclamans* Viereck in Arizona Citrus Groves. *Jour. Econ. Ent.* 48(2):1:61-163. 1955.
- Hopkins, L., Abu Yaman, I. K., and Carruth, L. A. Flavor evaluation and residue analysis of malathion-treated lettuce. *Jour. Econ. Ent.* 48(2):151-152. 1955.
- Humphrey, R. R. Grasslands improvement — a vast profit potential. *Agricultural and Food Chemistry* 3(4): 3 pp. 1955.
- Keener, P. D. *Cladosporium acidiicola* Thuem. and *Tuberulina persicina* (Ditm.) Sacc., associated with *Puccinia conspicua* (Arth.) Mains on *Helenium hoopesii* A. Gray in Arizona. *Plant Disease Reporter*, 38(9):690-694. (1954. illus.)
- Kemmerer, A. R. (See under Vavich)
- Kurtz, E. B. Editor of: Morphology of Cacti. Sect. III. *Fruits and Seeds*, by Franz Buxbaum, Abbey Garden Press, Pasadena, 51 pages. 1955.
- (See under Anderson, R. Y.)
- Kurtz, E. B. and Anderson, R. Y. Pollen analysis, *University of Arizona Physical Sci. Bull.* No. 2, Chap. 6, pp. 113-125. 1955.
- Marlatt, R. B. Effectiveness of streptomycin as a control for common bacterial blight of pinto bean. *Plant Disease Reporter*, 39:213-214. 1955.
- Yellow-resistance cabbage varieties in Arizona. *Plant Disease Reporter* 39(5):414-415. 1955.
- Raica, N. (See under Vavich)
- Reed, R. E. Serology and Coccidioidin skin testing in diagnosis of canine coccidioidomycosis. *Proceedings Book*, American Vet. Med. Assn., 91st Annual Meeting, 1954. pp. 199-203.
- Sharples, G. C. and Burkhart, L. Seasonal changes in carbohydrates in the Marsh grapefruit tree in Arizona. *Proceedings of the Am. Soc. for Hort. Sci.* 63:74-80. 1954.
- Stewart, J. K. Arizona spring lettuce refrigeration requirements during marketing periods. *American Soc. for Hort. Sci.* Vol. 65, pp. 387-392. 1955.
- Stull, J. W. (See under Vavich)
- Tuttle, D. M. and Butler, G. D., Jr. The yellow clover aphid — a new alfalfa pest in the Southwest. *Jour. Econ. Ent.* 47:1157. 1954.
- Vavich, M. G., Stull, J. W., Raica, N. and Kemmerer, A. R. Effect of nonfat milk on the utilization of carotene and vitamin A. *Archives of Biochemistry and Biophysics*, 55:310. 1955.
- Vavich, M. G., Kemmerer, A. R., and Hirsch, J. S. The nutritional status of Papago Indian children. *Jour. of Nutrition* 54:121. 1954.

- Vavich, M. G. (By B. W. Heywang, H. R. Bird, and M. G. Vavich). The level of protein in the diet of laying white leghorns during hot weather. *Poultry Sci.* 34:148. 1955.
- Werner, F. G. *Pyrota plagiata* (Haag) a valid Mexican species (Coleop., Meloidae). *Bul. of the Brooklyn Entomological Soc.* 49:102-104. 1954.
- Studies in the genus *Epicauta* of the North American continent, The Claviceps Group (Coleop., Meloidae). *Bul. of the Brooklyn Ent. Soc.* 50:1-12. 1955.
- Worley, S., Jr. (McGregor, S. E., Rhyne, C., and Todd, F. E.). The role of honey bees in cotton pollination. *Agron. Jour.* 47(1):23-25.

ARTICLES IN TRADE JOURNALS OR SIMILAR SPECIALIZED PUBLICATIONS

- Burkhart, L. "Short Course for Arizona Nurserymen," *American Nurseryman*, Jan. 15, 1955.
- (See under Stewart)
- Fuller, W. H. "Alkali Conditions Affecting Turf Culture," *The Golf Course Reporter*, Vol. 22, No. 5, July, 1954.
- Hillman, J. S. "Area Shifts in the Western Lettuce Industry," *Western Grower and Shipper*, Vol. 26, No. 4, Apr., 1955.
- Pahnish, O. F. "A Look at Dwarfism," *The Arizona Cattlelog*, Aug., 1954.
- Pew, W. D. "Lettuce Culture: Irrigation and Fertilization Practices," *Western Grower and Shipper*, Vol. 26, No. 3, March, 1955.
- Safley, C. E. "Experiment Stations are Inbreeding Beef Cattle," *The Arizona Cattlelog*, Sept., 1954.
- Seltzer, R. E. "The Cattle Cycle," *Arizona Cattlelog*, Vol. IX, No. 12, Aug., 1954.
- "Consumer Preference for Beef," *Arizona Cattlelog*, Vol. X, No. 4, Dec., 1954.
- "Recent Developments in the Western Feeder Cattle Industry," *Arizona Cattlelog*, Vol. X, No. 9, May, 1955.
- Stanley, E. B. "Range Nutrition," *Western Livestock Journal*, July, 1954.
- St. Clair, J. S. and Vanvig, A. "How Should You Pick Cotton?" *Farm Management*, Vol. III, No. 12, Dec., 1954.
- Stewart, J. K. and Burkhart, L. "Research Aids Shippers in Lettuce Handling 'Revolution'," *Western Grower and Shipper*, Vol. 25, No. 12, Nov., 1954.
- Stubblefield, T. M. "Outlook for Beef Cattle," *The Arizona Cattlelog*, Vol. X, No. 4, Dec., 1954.
- Vanvig, A. (See under St. Clair)

**BY-LINED ARTICLES IN NEWSPAPERS OR OTHER
PERIODICALS OF GENERAL FARM CIRCULATION,
AND MISCELLANEOUS**

- Abbott, J. L. and McGeorge, W. T. "Fertilizing Old Alfalfa," *Arizona Farmer and Rancher*, Jan. 8, 1955.
- Davis, R. N. "Producing Good Roughage," *Maricopa County D. H. I. A. 1954 Annual Report*.
- Fazio, S. and Burkhart, L. "Lettuce Rib Discoloration," *Ariz. Agr. Exp. Sta. Progress Report*, Oct., 1954.
- Kurtz, E. B. *Introductory Plant Physiology Laboratory Manual*, Burgess Publ. Co. 65 pages, 1954.
- McGeorge, W. T. "What About Soil Conditioners," *Arizona Farmer and Rancher*, July 31, 1954.
- "Case for Soil Analysis," *Arizona Farmer and Rancher*, March, 1955.
- "Soil Secrets Unlocked: Laboratory Analysis of Fertility, Salinity and Alkalinity Guide for Arizona Farmers," *Arizona Farmer and Rancher*, April 2, 1955.
- (See under Abbott)
- Pistor, W. J. "Beef Measles," University of Arizona Agricultural Extension Service Circular No. 230. 1955.
- St. Clair, J. S. "Many Problems Facing Growers Linked to Acreage Reduction," *Arizona Republic*, May 8, 1955.

ARTICLES IN "PROGRESSIVE AGRICULTURE IN ARIZONA"

Published Quarterly by
The College of Agriculture
of the University of Arizona

- Boyle, Alice. Antibiotic Control For Fire Blight?, Vol. VI, No. 4
- Burkhart, Leland. New Horizons in Horticulture, Vol. VI, No. 3
- (See under Stewart)
- Butler, G. D. (See under Tuttle)
- Carruth, Laurence A. Entomology is Vital!, Vol. VI, No. 3
- (See under Hopkins)
- Day, Arden D. What Varieties of Small Grains Shall I Plant?, Vol. VI, No. 3
- Fazio, Steve, and Folkner, Joseph A. Report On Bermuda Grass, Vol. VI, No. 4
- Fisher, Warner D. A Better Way to Measure Hail Injury in Cotton, Vol. VII, No. 1
- Folkner, J. S. Try These Trees and Shrubs, Vol. VI, No. 3
- (See under Fazio)
- Foster, R. E. A New Cantaloup for the Yuma Area, Vol. VI, No. 4
- Frost, K. R. Sprinkler Irrigation of Citrus Tested, Vol. VI, No. 3
- Hilgeman, R. H., and Pew, W. D. Principles of Irrigation for Maximum Production, Vol. VI, No. 2
- Hilgeman, R. H. Irrigation of Citrus Trees, Vol. VI, No. 2
- Hilgeman, R. H. and Howland, L. H. Fruit Measurements and Tensiometers Can Tell You When to Irrigate Citrus Trees, Vol. VII, No. 1

- Hopkins, Lemac, Spitler, G. H., and Carruth, L. A. More About the Damaging Khapra Beetle in Arizona, Vol. VII, No. 1
- Hopkins, Lemac (See under Tuttle)
- Howland, L. H. (See under Hilgeman)
- Marlatt, R. B. Good Cabbage Crop Possible in Spite of Cabbage Yellows, Vol. VII, No. 1
- Meade, Arland R. Research Spirit, Vol. VI, No. 4
- Pasvogel, Myron. Does It Pay to Put Your Birds in a Cage?, Vol. VI, No. 4
- Pew, W. D. Fertilizer and Water Efficiency, Vol. VI, No. 2
 (See under Hilgeman)
- Irrigation of Vegetable Crops, Vol. VI, No. 2
- Pistor, Wm. J. Respiratory Disease in Your Chickens?, Vol. VI, No. 3
- Reed, R. E. Animals Can Get Valley Fever Too, Vol. VI, No. 4
- Schwalen, Harold C. Arizona's Water Problem, Vol. VI, No. 2
- Stanberry, C. O. Alfalfa Irrigation, Vol. VI, No. 2
- St. Clair, James S. (See under Vanvig)
- Stewart, J. K. and Burkhart, Leland. Pre-Cool Lettuce, Vol. VI, No. 3
- Stewart, J. K. Rapid Cooling Makes More Marketable Sweet Corn, Vol. VII, No. 1
- Streets, R. B. Date of Planting Affects Root Rot and Production in Castor Beans, Vol. VII, No. 1
- Tuttle, D. M., Hopkins, L., and Butler, G. D., Jr. Yellow Clover Aphid, Vol. VI, No. 4
- Vanvig, Andrew, and St. Clair, James S. Machine or Hand Cotton Picking?, Vol. VI, No. 3
- Wood, Mary Adelle. Beef is to Eat, Vol. VI, No. 4

STAFF

FOR FISCAL YEAR ENDING JUNE 30, 1955 AGRICULTURAL EXPERIMENT STATION

PHIL S. ECKERT.....Director
RALPH S. HAWKINS.....Associate Director
ARLAND R. MEADE.....Editor

AGRICULTURAL BIOCHEMISTRY DEPARTMENT

ARTHUR R. KEMMERER.....Agricultural Biochemist
MITCHELL G. VAVICH.....Associate Agricultural Biochemist
*EMILY BRODIE.....Research Associate
*ALICE B. STANFIELD.....Research Associate
WINIFRED S. FLEMING.....Research Assistant
+WILLIAM F. McCAUGHEY.....Research Assistant
NICHOLAS RAICA, JR.....Research Assistant

AGRICULTURAL CHEMISTRY AND SOILS DEPARTMENT

WILLIAM T. McGEORGE.....Agricultural Chemist
THEOPHIL F. BUEHRER.....Physical Chemist
WALLACE H. FULLER.....Associate Biochemist
HOWARD V. SMITH.....Associate Agricultural Chemist
JAMES L. ABBOTT.....Assistant Agricultural Chemist
EDWARD L. BREAZEALE.....Assistant Agricultural Chemist
GEORGE E. DRAPER.....Assistant Agricultural Chemist
KENT B. TYLER.....Research Assistant

AGRICULTURAL ECONOMICS DEPARTMENT

GEORGE W. BARR.....Agricultural Economist
RAYMOND E. SELTZER.....Agricultural Economist
JIMMYE S. HILLMAN.....Associate Agricultural Economist
JAMES S. ST. CLAIR.....Assistant Agricultural Economist
THOMAS M. STUBBLEFIELD.....Assistant Agricultural Economist
ANDREW VANVIG.....Assistant Agricultural Economist

AGRICULTURAL ENGINEERING DEPARTMENT (Irrigation)

HAROLD C. SCHWALEN.....Agricultural Engineer
‡GEORGE E. P. SMITH.....Agricultural Engineer
KENNETH R. FROST.....Assistant Agricultural Engineer
§EMMETT R. HOLEKAMP.....Assistant Agricultural Engineer
RICHARD J. SHAW.....Assistant Agricultural Engineer

*In Co-operation with Southwestern Clinic

+In Co-operation with U.S.D.A.

‡Retired June 30, 1955

§Resigned June 30, 1955

AGRONOMY & RANGE MANAGEMENT DEPARTMENT

DEAN F. McALISTER.....	Agronomist
ROBERT R. HUMPHREY.....	Associate in Range Management
*KARL HARRIS.....	Irrigation Engineer
WARNER D. FISHER.....	Associate Agronomist
ARDEN D. DAY.....	Assistant Agronomist
RONALD B. FOSTER.....	Assistant Agronomist
KEITH C. HAMILTON.....	Assistant Agronomist
†KENNETH O. RACHIE.....	Assistant Agronomist
RAYMOND M. TURNER.....	Assistant in Range Management
DAVID G. WILSON.....	Assistant in Range Management
CHARLES GRUNDMANN.....	Research Assistant
*DOYLE E. MANES.....	Field Assistant
‡LOYAL A. MEHRHOFF.....	Research Assistant
REX K. THOMPSON.....	Field Assistant
SCS Nursery:	
LOUIS P. HAMILTON.....	Nursery Manager
ELLSWORTH G. HENDRICKS.....	Nursery Foreman
EDGAR H. MORGAN.....	Farm Technician

ANIMAL HUSBANDRY DEPARTMENT

ERNEST B. STANLEY.....	Animal Husbandman
CARL B. ROUBICEK.....	Director Animal Husbandry Research
O. FLOYD PAHNISH.....	Assistant Animal Husbandman
ROBERT M. RICHARD.....	Assistant Animal Husbandman
CARL E. SAFLEY.....	Assistant Animal Husbandman

ANIMAL PATHOLOGY DEPARTMENT

WILLIAM J. PISTOR.....	Animal Pathologist
RAYMOND E. REED.....	Assistant Animal Pathologist
ROBERT J. TRAUTMAN.....	Research Assistant

BOTANY DEPARTMENT

†WALTER S. PHILLIPS.....	Botanist
EDWARD B. KURTZ, JR.....	Acting Head
JOHN J. THORNER.....	Taxonomist
CHARLES T. MASON, JR.....	Assistant Taxonomist
ROGER Y. ANDERSON.....	Research Assistant
WALTER P. GIBBLE.....	Research Assistant

DAIRY HUSBANDRY DEPARTMENT

RICHARD N. DAVIS.....	Dairy Husbandman
F. GORDON HARLAND.....	Assistant Dairy Husbandman
JOHN W. STULL.....	Assistant Dairy Husbandman
RICHARD W. MAUNTEL.....	Manager, Milk Processing Plant

*In Co-operation with U.S.D.A.

†On Leave

‡Resigned June 30, 1955

ENTOMOLOGY DEPARTMENT

LAURENCE A. CARRUTH.....	Entomologist
GEORGE D. BUTLER.....	Assistant Entomologist
* LEMAC HOPKINS.....	Assistant Entomologist (Mesa)
DONALD M. TUTTLE.....	Assistant Entomologist (Yuma)
FLOYD G. WERNER.....	Assistant Entomologist

HOME ECONOMICS (School of)

BERTHA A. GREGORY.....	Director
FAYE C. JONES.....	Home Economist
ETHEL M. THOMPSON.....	Nutritionist

HORTICULTURE DEPARTMENT

LELAND BURKHART.....	Horticulturist
ROBERT E. FOSTER.....	Associate Horticulturist (Mesa)
ROBERT H. HILGEMAN.....	Associate Horticulturist (Tempe)
WEYMOUTH D. PEW.....	Associate Horticulturist (Mesa)
CLIFTON W. VAN HORN.....	Associate Horticulturist (Yuma)
STEVE FAZIO.....	Assistant Horticulturist
JOSEPH S. FOLKNER.....	Assistant Horticulturist
LLOYD H. HOWLAND.....	Assistant Horticulturist (Tempe)
GEORGE C. SHARPLES.....	Assistant Horticulturist (Tempe)
* JOSEPH K. STEWART.....	Assistant Horticulturist (Mesa)
* MERLE E. BACON.....	Field Assistant

PLANT BREEDING DEPARTMENT

WALKER E. BRYAN.....	Plant Breeder
ELIAS H. PRESSLEY.....	Plant Breeder
* SMITH WORLEY, JR.....	Assistant Plant Breeder

PLANT PATHOLOGY DEPARTMENT

RUBERT B. STREETS.....	Plant Pathologist
ALICE M. BOYLE.....	Assistant Plant Pathologist
PAUL D. KEENER.....	Assistant Plant Pathologist
ROBERT B. MARLATT.....	Assistant Plant Pathologist (Mesa)
HELEN E. SIMONSEN.....	Research Assistant

POULTRY HUSBANDRY DEPARTMENT

MYRON W. PASVOGEL.....	Poultry Husbandman
HUBERT B. HINDS.....	Associate Poultry Husbandman

SUBSTATIONS

D. C. AEPLI.....	General Superintendent and Supt., Mesa
G. E. BELL.....	Foreman, Mesa
L. C. CHAPMAN.....	Superintendent, Safford
W. N. HALL.....	Foreman, University Farm, Tucson
R. H. HILGEMAN.....	Superintendent, Salt River Valley Citrus Research, Tempe

*Resigned June 30, 1955

E. H. HUSSMANN.....	Superintendent, University Farm, Tucson
*A. M. MCKINNEY.....	Foreman, Yuma
F. PRITCHARD.....	Superintendent, Yuma
F. W. RICHARDSON.....	Superintendent, University Poultry Farm, Tucson
W. A. RISETTER.....	Foreman, University Poultry Farm, Tucson
C. O. STANBERRY.....	Superintendent, Yuma Mesa (in co-op with U.S.D.A. Wellton-Mohawk Div., Gila Irrigation Project)

APPOINTMENTS

FISHER, WARNER D.....	Associate Agronomist
FOSTER, RONALD B.....	Assistant Agronomist
GREGORY, BERTHA A.....	Director, School of Home Economics
GRUNDMANN, CHARLES.....	Research Assistant
HALL, WILLIAM N.....	Foreman, University Station, Tucson
HAMILTON, KEITH C.....	Assistant Agronomist
HOWLAND, LLOYD H.....	Assistant Horticulturist
MANES, DOYLE E.....	Field Assistant
MEADE, ARLAND R.....	Editor
MEHRHOFF, LOYAL A., JR.....	Research Assistant
MCKINNEY, A. MARK.....	Foreman, Yuma Station
RICHARD, ROBERT M.....	Assistant Animal Husbandman
ROUBICEK, CARL B.....	Director, Animal Husbandry Research
SIMONSEN, HELEN E.....	Research Assistant
STUBBLEFIELD, THOMAS M.....	Assistant Agricultural Economist
TURNER, RAYMOND M.....	Assistant, Range Management
TYLER, KENT B.....	Research Assistant
WERNER, FLOYD G.....	Assistant Entomologist

RESIGNATIONS

BACON, MERLE E.....	Field Assistant
BURRI, LLOYD W.....	Field Assistant
CORDS, HOWARD P.....	Assistant Agronomist
HOLEKAMP, EMMETT R.....	Assistant Agricultural Engineer
HOPKINS, LEMAC.....	Assistant Entomologist
MCKINNEY, A. MARK.....	Foreman, Yuma Station
MEHRHOFF, LOYAL A.....	Research Assistant
STEWART, JOSEPH K.....	Assistant Horticulturist
TSCHIRLEY, FRED H.....	Research Assistant
WAANANEN, MARTIN V.....	Assistant Agricultural Economist
WORLEY, SMITH, JR.....	Assistant Plant Breeder

*Resigned June 30, 1955

IV. FINANCIAL STATEMENT, 1954-55, UNIVERSITY OF ARIZONA,
AGRICULTURAL EXPERIMENT STATION

	Hatch	Adams	Purnell	Bankhead- Jones (5)	Bankhead- Jones (9b1&2)	Bankhead- Jones (9b3)	Title II	Non-Federal Funds	TOTAL
Received from the Treasurer of the U.S.	\$15,000.00	\$15,000.00	\$60,000.00	\$16,740.68	\$72,577.17	\$54,023.12	\$4,000.00		\$237,340.97
State Appropriations								\$294,434.32	294,434.32
Main Station								154,330.31	154,330.31
Substations									
Special Endowments									50,277.73
Sales								51,853.32	51,853.32
Total Receipts	\$15,000.00	\$15,000.00	\$60,000.00	\$16,740.68	\$72,577.17	\$54,023.12	\$4,000.00	\$550,895.68	\$788,236.65

RECEIPTS

DISBURSEMENTS

Personal Services	\$13,489.79	\$11,717.43	\$45,289.33	\$10,803.33	\$46,215.89	\$34,635.20	\$ 124.50	\$372,956.89	\$535,232.36
Travel		1,244.49	3,076.23	3,000.82	4,195.59	2,131.33	736.95	12,862.76	27,248.17
Transportation of Things		2.38	91.56		119.57	54.17		732.85	1,000.53
Communication Service		50.22	192.13	28.32	229.92	133.16		4,944.88	5,629.80
Rents and Utility Services		43.93	21.60		296.60	927.96		15,004.20	16,294.29
Printing and Reproduction			48.79	12.00	102.19	563.70	100.00	7,208.69	8,035.37
Other Contractual Services			176.03	681.08	80.08	1,344.04	1,506.66	21,169.49	26,727.47
Supplies and Materials			504.26	6,915.25	851.30	7,482.83	296.45	56,844.91	76,831.83
Equipment		882.37	788.81	1,399.84	1,366.22	10,389.48		49,369.95	69,910.02
Land and Structures			216.31			229.75		2,927.27	3,373.33
Contributions to Retirement		438.76	321.36	1,476.30	392.44	1,471.52		1,017.39	6,138.30
Taxes and Assessments		189.08	151.09	591.58	206.17	729.54	2.49	5,856.40	8,264.31
Total Disbursements	\$15,000.00	\$15,000.00	\$60,000.00	\$16,740.68	\$72,577.17	\$51,654.03	\$2,818.22	\$550,895.68	\$784,685.78