

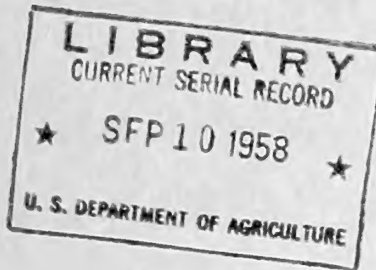
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FEDERAL-GRANT RESEARCH
at the
STATE AGRICULTURAL
EXPERIMENT STATIONS

Projects on
ENTOMOLOGY AND ECONOMIC ZOOLOGY
Part 7, Section d

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

Compiled January 1958 by

the State Experiment Stations Division, Agricultural Research Service, U. S. Department of Agriculture, Washington 25, D. C., for use of workers in agricultural research in the subject-matter areas presented. For information on specific research projects write to the Director of the Station where the research is being conducted.

Issued June 1958

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Section d: Insecticides

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INTRODUCTION

This compilation is one of a series providing information on State agricultural experiment station research supported by Federal-grant funds appropriated annually by Congress under authorization of the Hatch Act of 1887, as amended and approved Aug. 11, 1955, and Section 204(b) of the Agricultural Marketing Act of 1946. It is prepared for use by research workers in the subject-matter areas presented. Only that part of each State's research program supported by Federal-grant moneys is included.

In addition to the Federal-grant moneys, the State experiment stations receive some Federal support through cooperative agreements or contracts with the U. S. Department of Agriculture. Information on such research, along with other departmental research, is available in the Central Project Office, Agricultural Research Service.

A substantial part of each State agricultural experiment station's research is supported with moneys appropriated by the respective State or Territorial Legislatures and through other forms of private and public financing. Information on current agricultural research at the stations which is not financed under the Federal-grant program or through USDA cooperation can be obtained from experiment station directors.

The information given in the series of Federal-grant compilations includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, and the number of the regional project if it is a contributing project.

Relevant regional projects, if any, appear at the end of the compilation. States having projects contributing to regional projects are indicated. The Roman numeral (and capital letter) refer to the location in the summary of the contributing project title and objectives. The States are grouped into four major regions. These are designated NC-North Central, NE-Northeastern, S-Southern, and W-Western. The capital letter "M" following the letters for the region indicates regional marketing projects.

I. INSECTICIDES

A. General

- Ala. Toxicology of Insecticides. Learn in laboratory and greenhouse the susceptibility or resistance of economic insect pests to insecticides. (2) Study factors involved in natural and acquired resistance of insects to insecticides. (3) Learn accumulation and persistence of insecticides in soil as a result of insect control measures and the effects of insecticides on crops. (4) Learn phytotoxicity of insecticides to agricultural crops. (5) Relationships between method and time of applying various insecticides to crop plants and insecticidal residues present at harvest.
Zool-Ent. 112
- Ga. Toxicity of Insecticides to Various Insects Under Controlled Conditions with Emphasis on Field Crops Insects. (1) Establish median lethal dosages of various insecticides to the species and strains of insect pests of economic importance. (2) Learn if any of these insects have developed resistance; (3) if so, work out other control programs.
Ent. 216
- Minn. Physiological Studies on Insect Cuticle, Muscle, and Other Systems. To (1) complete studies underway on cuticle structure and penetration, (2) amass data on temperature coefficients to evaluate significance of temperature effects on overall processes such as respiration, (3) initiate studies on physiology of reproduction, and (4) study nature of so-called intracellular symbionts of insects.
Ent. 1708 Coop. HEW-Natl. Inst. Health, USDA
- N. H. Factors Affecting the Action of Acaricides. To determine (1) relation of chemical structure and physical properties of material to potency of miticide; and (2) what factors may influence action of acaricides, more particularly such factors as climatic, physiological age, and development of resistance to Ovotran, Neotran, organic phosphates and other acaricides.
Ent. 43
- N. H. Testing New Organic Pesticides Under New Hampshire Conditions. Test promising new insecticides and acaricides under State conditions to learn their effectiveness in control of insects and mites affecting orchard and small fruits, vegetables, and man and domestic animals.
Ent. 122

- Oreg. Chemical Aspects of Insecticides and Fungicides. To (1) develop methods for analysis of agricultural products for insecticide and fungicide residues and learn amounts of residues; (2) develop better techniques for applying insecticides and fungicides; (3) study biochemical effects of insecticides and fungicides on plant and animal tissues; and (4) improve formulation methods for pesticides.
Agr. Chem. 85
- Pa. Development of New Chemicals for Use as Insecticides, Fungicides, Bactericides and Herbicides. To synthesize and investigate chemical and biological properties of chemical compounds of potential usefulness in pest control materials.
Ent., Zool., Biochem. 999 Coop. Eastern Regional Laboratory
- Tenn. Evaluation of New Insecticides. To learn (1) effectiveness and economy of new insecticides for various crops under state conditions; (2) magnitude of insecticide residues on plants; (3) effect of insecticides on flavor and aroma of plant products.
Ent. 100

B. Adjuvants and Formulations

- Hawaii Insecticidal Formulations and Their Effects on Insects and Plants. To (1) determine effect of physical state of insecticidal formulations on their toxicity to insects; (2) determine tolerance of various subtropical crops to different chemical sprays and dusts; (3) improve or develop effective control of insect pests under Hawaiian conditions through use of proper insecticide formulations.
Ent. 964
- Mich. Fundamental and Applied Colloid-Chemical Aspects of Agricultural Chemistry. To (1) improve or devise new wax emulsions for treating nursery stock and plant materials so as to reduce their cost of production and increase usefulness in horticultural and other practices, and (2) develop new or improved formulations and methods for the production of colloidal iodine.
Chem. 1
- N. Y.
(Cornell) The Influence of Climatic Factors and the Chemical and Physical Properties of Diluents and Carriers on the Effectiveness of Insecticide Dusts and Wettable Powder. To measure physical, chemical, and toxicological properties of diluents and carriers and to correlate these properties with the behavior of insecticide formulations during application and use as residual deposits under known climatic conditions.
Ent. 95

C. Deposits and Residues

- Ala. Effect of Insecticidal Residues on the Marketability of Farm Products. (1) Learn amounts of insecticidal residues on harvested farm products. (2) Develop procedures for removal of residues from certain products, especially when products contain residues in excess of those permitted by Miller Amendment.
Zool. & Ent. 577
- Ariz. Insecticide Residues: Their Nature and Persistence on Arizona Crops. (1) Learn nature and persistence of residues of insecticides commonly used for crop protection under weather conditions which prevail in state in such a manner that half-life and dissipation curves can be determined. (2) Assemble information on persistence and degradation of insecticide residues in state sufficient to insure that all official recommendations for chemical control of insects on agricultural crops will be made in compliance with the Miller Amendment to the Federal Food, Drug and Cosmetic Act. (3) Evaluate promising new insecticides in relation to possible residue problems under state conditions. (4) Make related studies of a more basic nature.
Ent. 416 (W-45) Coop. ARS
- Ariz. Post-Harvest Degradation of Insecticide Residues on Various Arizona Crops. (1) Learn nature and persistence of residues of insecticides used for crop protection under conditions occurring after harvest period; learn if any variation in normal harvest procedure can accelerate a decrease in residual amount of insecticides. (2) Assemble information on post-harvest insecticide residue persistence curves to predict conditions under which over-tolerances of insecticide residues on crops at harvest may be reduced to acceptable levels before time of consumption.
Ent. ES 480
- Ark. Determination of Effect of Insecticides on Plants and Soils, Including Bio-Assay of Residues. To determine bio-assay methods of determining insecticide residues on crops and in soil to evaluate effects of insecticides, solvents, diluents, and formulations on plant growth, harvest residues and after effects in the soil.
Ent. 370 (S-22)
- Calif. Deposit of Insecticides and Analysis of Residues. Pursue: (1) use of known analytical methods with samples from experimental plots of field entomologists, (2) development or adaptation of methods for new pesticides, (3) study of degradation and (or) metabolic products to ascertain what substance(s) is most important in a residue.
Ent. and Parasitol. 902-A,B

Calif.

A Regional Coordination Center for the Collection, Tabulation, and Distribution of Unpublished Research Data on Residual Pesticide Chemicals. (1) Collect data on residues of pesticides on file in some western experiment stations, with information on methods of sampling, subsampling, extraction, purification and analysis used in the various stations. (2) Similarly, collect new data on pesticide residues and on procedures used in collection. (3) Collect other pertinent data on pesticide residues and methods for obtaining, when such information from western sources is scanty. (4) Establish uniform method for reporting and tabulating data on pesticide residues. (5) Distribute tabulated data to western experiment stations, and other proper authorities. (6) Promote exchange of information on residue problem from and to coordination center, etc.

Ent. and Parasitol. 1719 (W-45) Coop. ARS

Colo.

Persistence of Pesticide Residues Under Mountain Climatic Conditions. Learn (1) toxic residues resulting from recommended spray programs on alfalfa, apples, pears, tomatoes, potatoes and green beans; (2) dissipation of chemical residues for the various insecticides used under field conditions. (3) Develop phases concerned with toxic residues for projects now in force, evaluate insecticides on principal orchard, potato, tomato and bean pests.

Ent. 237 (W-45)

Conn.

A Study of the Effectiveness of Insecticides To Control Forage Insect Pests, and of the Residues Remaining on Alfalfa Following Their Use. (1) Evaluate the effectiveness of some new insecticides in controlling forage insects. (2) Learn timing and rates of application for effective control. (3) Learn residues remaining on alfalfa at harvest following foliar application of insecticides. (4) Establish curves for disappearance of residues by analyzing samples taken at intermediate stages between application and harvest.

Ent. 312 (NE-36)

Conn.

Relation Between Conductivity of Apples and Flavor. Compare conductivity at harvest of apples treated with different pesticides and flavor evaluation of the fruit by taste panels.

Ent. 316 (NE-15)

Fla.

Analytical and Sampling Procedures for Determining Parathion, DDT and Other Organic Insecticide Residues on Vegetables. To (1) make lab evaluation, modification and adaptation of current chemical procedures involved in the determination of parathion, DDT and other related organic insecticides on specific vegetable crops; and (2) develop valid and practical field sampling procedures.

Home Econ., Hort. 690 (S-22)

- Fla. Effect of Climatic Factors on Insecticide Residues on Vegetable Crops. Learn extent to which climatic factors as sun, rain and wind affect insecticidal residues on certain vegetables. Ent., Hort. 746
- Ga. Determination of Amounts and Effects of Insecticide Residues on Plants and Soils. (1) Learn insecticide residues on certain important Georgia crops following the use of various insecticides at different rates, formulations and methods of applications. (2) Evaluate effects of insecticide residues on plant growth, plant products and soil. Ent. 70 (S-22) Coop. ARS
- Ill. Fundamentals, Equipment, and Techniques in Application of Agricultural Chemicals. Develop (1) information needed for design of inexpensive equipment to apply fertilizer solutions, using gravity flow and top venting, with variability of rate less \pm 5%; (2) information needed for design of gravity fed nozzles suitable for broadcast application of fertilizer solutions; (3) adaptations of above equipment to existing machines (plows, planters, cultivators, etc.). Learn (4) feasibility of and factors affecting direct injection of anhydrous ammonia; (5) information needed for design of equipment to brand spray Randox, (6) Establish design characteristics of equipment suitable for application and incorporation of soil insecticides and herbicides. (7) Learn design characteristics of satisfactory equipment for application of granular DDT. Agr. Engin. 10-336
- Ill. Fundamental Problems Associated with the Use of Pesticidal Chemicals in Soils. To determine (1) rate at which insecticidal chemicals accumulate in soils under normal usage; (2) plant and animal tolerance for varying degrees of soil contamination; and (3) rate of insecticide loss from soils of varied types and under varied climatic conditions. Ent. 12-311 (NC-19) Coop. ARS
- Ill. The Magnitude, Character, and Persistence of Insecticide Residues on or in Food, Feed, and Forage Crops. Isolate, define, and evaluate important factors that influence or determine the magnitude and/or persistence of insecticide residues on or in plants and animals. Ent. 12-312 (NC-33) Coop. ARS
- Iowa The Effects of Pesticide Residues on Feed and Forage Fed to Livestock. Provide information on fate of forage residues of selected organic phosphorus pesticides in livestock and edible products derived therefrom. Zool., Ent. 1336 (NC-33)

- Kans. Accumulation and Effect of Pesticidal Residues in Soils Following Pest Control Practices. To determine (1) rate of insecticidal accumulation and disintegration in soils of various types and at various locations under varying climatic conditions following application of insecticides at normal application rates and at abnormal rates; and (2) effect of pesticidal accumulation in soils upon soil microorganisms and on agricultural crops ordinarily grown in representative localities.
Ent. 393 (NC-19)
- Kans. Factors Influencing the Magnitude, Character and Persistence of Organic Phosphorus Insecticide Residues on or in Food and Forage Crops. Isolate, define, and evaluate the factors influencing the magnitude and/or persistence of organic phosphorus insecticide residues on or in plants and animals.
Ent. 481 (NC-33)
- Maine The Effect of Pesticides on Quality of Fruits and Vegetables. To (1) evaluate some sensory techniques commonly used to learn quality of fruits and vegetables; and (2) learn effect of some pesticides on quality of selected fruits and vegetables.
Ent., Hort., Pl. Path. 28 (NE-15)
- Md. Factors Influencing Spray Deposits on Some Vegetable Crops. Learn effects of formulation and method of application of insecticidal sprays on amount of insecticide residues deposited and duration of deposits on snap beans, broccoli, and leafy vegetables.
Ent., Hort., Agr. Engin. H-67 (NE-36) Coop. ARS
- Mass. Pesticide Residues on or in Agricultural Products. Make determination of (1) pesticide residues on forage crops at intervals following application and at harvest; (2) pesticides in products from livestock fed treated forage; (3) accumulated residues resulting from repeated applications of same or related pesticides on fruits and vegetables.
Ent. 58 (NE-36)
- Mich. A Determination of the Possibility of Controlling Certain Economic Insects by the Application of Chemicals Upon or Near the Soil Surface. To devise methods of more certain and cheaper controls for some of the insects of fruit, forest nursery and nursery crops in general by determination of effect of various insecticides on or near the ground surface on insects spending a part of their life cycle upon or in the soil.
Ent. 28
- Mich. The "Secondary" Effects From Soil Application of Pesticides. To (1) cooperate with work on Regional Project NC-19, led by Wisconsin Station; (2) accumulate information on hazards associated with use of pesticides under Michigan conditions, particularly those on soil. More information is needed on residues—magnitude, persistence, effect on plant growth, off-taste in product, and effect on other biotic factors.
Ent. 451 (NC-19)

- Miss. A Study of Insecticides, With Special Reference to Factors Governing Effectiveness Such as Physical Characteristics, Weather and Distribution Over Plants. Dust: Learn effect of: particle size of insecticides and acaricides on rate of kill, control and period of effectiveness; particle size of diluent in relation to insecticide or acaricide (or carrier) on rate of kill, control and period of effectiveness; coverage of plants with insecticide or acaricide on rate of kill, control and amount of damage; weather conditions on amount of insecticide deposited, distribution on plant and effectiveness as related to above; air velocity of dusting machine on distribution of insecticide or acaricide on deposit, etc. Sprays: Learn effect of: placement of nozzle and its size, dilution of insecticide or acaricide deposited and distribution over plant on rate of kill, control, and period of effectiveness; weather on distribution on plant and effectiveness as related to previous statement; Systemic insecticide and acaricides. Learn effect of: method and time of application on initial control and period of effectiveness and soil type on their efficiency.
Ent. HH-3
- Mo. Hazards Associated with the Use of Pesticides. To learn (1) rate of insecticidal accumulation in soils from normal usage, (2) plant and animal tolerance for varying degrees of soil contamination, (3) rate of insecticidal decomposition in a 4-year rotation in soils following initial applications at normal and excessive rates.
Ent. 283 (NC-19)
- N. J. Determination of Pesticide Residues on Raw Agricultural Commodities. (1) Learn residues of insecticides, fungicides, and herbicides on and in forages, fruit, vegetables, and milk, following application of pesticides. (2) Improve current analytical methods and develop new ones for learning pesticide residues on and in raw agricultural commodities.
Agr. Chem. 102 (NE-36)
- N. J. A Study of the Influence of Pesticides, Fertilizers, and Other Agents on the Flavor of Fresh, Canned, and Frozen Foods. To provide the Plant Pathology and Entomology Departments and the New Jersey Cannery Association with information on the influence of certain pesticides on flavor of fresh and canned foods.
Food Technol. 286
- N. J. The Effect of Pesticides on Quality of Fruits and Vegetables. Develop a more efficient, objective, and uniform method of determining quality and more particularly the flavor of pesticide treated fruits and vegetables.
Food Technol. 290 (See NEM-18, Quality Maintenance and Prepackaging in Marketing Fresh and Processed Vegetables in Part 14, Section b.)

N. Y.
(Cornell)

The Basic Requirements and Design Principles of Mechanical Equipment for Control of Insects, Diseases, and Weeds. To study the requirement of mechanical equipment for pest control practices with the objective of determining basic information necessary to design new or to modify existing available equipment for practical use. To design and construct equipment for experimental use for the purpose of determining practical control measures and suitable machinery. Assemble information necessary to design sprayers for weed control in row crops, open fields, and lawns. Machines to be capable of applying concentrated herbicides at the rate of as low as one gallon per acre. Experimental machines built and used for field tests. Recognized procedures for plot testing shall be followed. Cooperating Dept. will provide the herbicides and supervise the layouts of plots and measurements of material efficiency.
Veg., Ent. Pl. Path., Flor., Agr. Engin. 32

N. Y.
(Cornell)

Insecticide and Fungicide Residues in Forage and Animal Products. (1) Develop sampling techniques for insecticide and fungicide residues of forage crops and learn what constitutes an adequate sample, how it should be chosen, harvested and handled. Learn (2) accumulation of fungicides in soils and their effect on forages. Determine: (3) insecticide and/or fungicide residues of forage and silage from present recommended schedules as applied by growers and correlate residues with different types of formulations, application methods, dilution, pressures etc.; (4) effects of curing hay and methods of handling and storage of it on residues and residue losses. Study (5) timing methods of application of insecticides based on plant height, arbitrary application schedules or numbers of days to optimum date of harvest and correlate these facts with insect control and residues at harvest; (6) effects of growth and weathering on insecticide residues of various formulations on forage, peavine and corn silage. Determine: (7) levels of insecticide and/or fungicide residues that may be fed safely to cattle without contamination of milk or meat; (8) fungicidal residues at time of pasturing, in hay or ensilage, and at feeding; (9) levels of residues that can be safely fed to poultry.
Ent., Pl. Path. 175 (NE-36)

N. Y.
(State)

Pesticide Residues on Apples and Grapes at Harvest and at Intervals During the Growing Season. Learn residues at harvest on apples and grapes grown in this area, especially where mixed pesticides have been applied. Learn interval between last application and time of harvest so that federal tolerances can be met.
Food Sci. and Technol. 19 (NE-36)

- N. C. Pesticide Residues In or On Forage Crops and in Products From Animals Fed These Forages. Evaluate, modify and adapt chemical methods of analysis for: (1) pesticides used on forage crops for use in learning their residues in relation to effective use of these chemicals in controlling insect pests; (2) learning pesticide residues in animal products. (3) learn if feeding of forage bearing pesticide residues will contaminate animal products.
Chem., Ent., Anim. Indus. 146 (S-22)
- Ohio Basis for Agricultural Aircraft Equipment Design. To (1) provide basis for better agricultural aircraft solids distributor design and placement; (2) provide basis for design of metering devices, agitators, hoppers, and power source and transmission systems; (3) assemble information on spray equipment and provide basis for combination liquid and solids dispensing equipment; and (4) check lab results with controlled field studies for effectiveness of application, performance of equipment and information on application requirements, including rate, distribution, coverage, and type of material.
Agr. Engin. 83
- Ohio Pesticide Residues in Soils Following Pest Control Practices. To study (1) pesticidal accumulations and disintegration in soils of various types following applications for pest control; and (2) effect of pesticidal accumulation in soils upon flora and fauna and on the growth, quality, and yield of crops.
Ent. 110 (NC-19)
- Ohio Pesticide Residues on Animal Feeds and Human Foods. To learn (1) magnitude and persistence of pesticides applied in various ways to various plant surfaces; (2) levels of residues in edible animal products.
Ent. 147 (NC-33)
- Pa. Chemical Studies of Plant Protectant Residues: Methods of Deposition and Removal. (1) Learn best methods for producing and maintaining deposits of pesticides which will be most effective for control of insects, plant diseases and weeds, (2) Study methods for reducing or removing pesticide residues remaining on crops at harvest.
Zool., Ent., Agr. and Biochem. 876
- Pa. Daphnia Bioassay Procedures. (1) Learn immobilization times of Daphnia in relation to concentration of various chemical compounds including those used in pesticides and in industrial wastes. (2) Develop procedures for using Daphnia in bioassay based on immobilization time-concentration relationships.
Zool., and Ent., Agr. Biochem. 1287

- Pa. Determination of Pesticide Residues. (1) Learn residues of insecticides, fungicides, and herbicides on fruit, vegetables, forage, livestock and poultry products following application of these materials. (2) Develop new or improved analytical methods for determining pesticide chemicals in residues.
Agr. Biochem. 1308 (NE-36)
- P. R. Pesticide Residues. Evaluate (1) endrin residue on pineapple fruit and juice; (2) parathion residue on acerola or West Indian cherry and juice; (3) make correlations between chemical and bioassay methods for determining endrin residues on pineapple fruit and juice and parathion residues on acerola cherry and juice.
Soils 104 (S-22)
- R. I. Pesticide Residues in Relation to Crop Production. (1) Learn pesticide residues on forage crops under field conditions. (2) Develop methods for separating respective residues resulting from mixtures of pesticides applied to forage crops. (3) Modification of chemical and biological assay methods for pesticide residues.
Pl. Path., Ent. Agr. Chem. 609 (NE-36) Coop. ARS
- S. C. Pesticide Residues - Determination; Effect on Plants and Soils.--A. Biological and Chemical Determinations of Pesticide Residues in the Soil.--B. Effects of Pesticide Residues on Plants and Soils. To (1) standardize and apply biological and chemical methods of pesticide residue analysis with chemical analyses; (2) to integrate results from biological and chemical analytical techniques; and (3) evaluate effects of pesticide residues on plant growth, plant products and soils.
Ent. Agron., Chem. 53 (S-22) Coop. ARS
- Tenn. Determination of Residues from Certain Pesticides When Applied for the Normal and Experimental Control of Insects and Diseases of Fruits and Forage Crops in Tennessee. Learn (1) residues from Captan when applied to strawberries, apples, and peaches under various conditions for disease control; (2) amounts of Toxaphene, DDT, and Demeton residues on strawberries when applied under various conditions for control of insects; (3) residues of Toxaphene, DDT, and Dieldrin on alfalfa when applied under various conditions for control of insects. (4) Develop or verify recommendations for use of pesticides under state conditions resulting in meeting tolerance regulations for food and forage crops.
Pl. Path., Agron., Ent. 49 (S-22)
- Va. Pesticide Residues on Forage, in Dairy and Poultry Products, and in Meat. To learn (1) residues of insecticides in raw whole milk following their use on cows and in barns; (2) residues of insecticides on forage, especially alfalfa, resulting from insect control programs; (3) residues in milk following feeding of insecticide treated hay; (4) residues in certain poultry products following ingestion of insecticides or their use in and around poultry houses.
Dairy Sci., Poultry Husb., Ent., Biochem. 93906 (S-22)

- Wash. Investigation of Insecticide Residues with Radioactive Tracers. To determine persistence, penetration, and translocation of insecticide deposits on plants by means of radioactive tracers, chemical analysis and bio-analysis.
Ent., Agr. Chem. 1109
- Wash. Determination of the Persistence of Pesticide Residues. To learn (1) persistence of pesticide residues on agricultural crops; (2) if levels of pesticide necessary for control are consistent with safe concentrations at time of harvest.
Ent., Agr. Chem. 1332
- Wash. Extraction Procedures for Analysis of Demeton (Systox) Insecticidal Residues. Develop a procedure for quantitative recovery of Demeton residues.
Agr. Chem. 1334 (W-45)
- Wis. Fundamental Problems Associated with the Accumulation of Pesticidal Chemicals in Soils. To determine magnitude of insecticidal accumulation in midwestern soils, rate and reasons for disappearance of typical insecticides from various soil types and effect of soil-borne insecticides on soil flora and non-insect fauna.
Ent. 897 (NC-19)
- Wis. Interrelationships Between Soil Insecticides and Soil Microorganisms. Study selected insecticides, emphasizing some of the more common chlorinated hydrocarbon compounds, to learn their effects on normal, and abnormal, and residual amounts on population changes of major groups of microorganisms; micro-biological processes fundamental to plant growth (ammonification, nitrification, carbon dioxide evolution, organic matter decomposition mechanisms, nitrogen fixation, etc.); alteration of microbial soil properties; the feasibility of devising a microbiological assay test comparable to those used in the bioassay of vitamins and similar compounds. Throughout the study, focus attention on role of various soil types and other chemical and physical factors appearing worthy of attention.
Bact. 897a (NC-19)
- Wis. Chemical Nature and Mechanism of Loss of Insecticide Residues on or in Food, Feed and Forage Crops. Study chemical nature of the insecticide degradation products in and on plants and evaluate their toxicological hazard.
Ent. 980 (NC-33)

D. Physiological Effects on Plants,
Vertebrate Animals and Insects

- Calif. Mode of Action of Insecticides. Study: metabolism of various insecticides in many species of insects, and biochemistry of the nervous and muscular system in *Blattella*.
Ent. and Parasitol. 902C
- Calif. Effects of Fumigants, Insecticides, and Herbicides on Soil Productivity. Learn (1) influence of soil properties and various soil management practices on effectiveness of fumigants, insecticides and herbicides; (2) effect of fumigants, insecticides and herbicides on chemical, physical, and microbiological properties of soil with special reference to soil productivity.
Soil and Pl. Nutr., Ent. 1532
- Conn. Long Range Effects of Insecticides on Insect Populations. Learn the long range effects of (1) persistent residual insecticides; (2) quick-acting non-persistent insecticides applied to; reduce an existing heavy population, as a preventive in anticipation of a heavy population or, to control a light population (simulating control of a pest reducing quality of crops) on the population of insects.
Ent. 315 Coop. Dept. of Army Surgeon's General Office
- Conn. Differences in Mode of Action of Insecticides. To (1) develop more effective techniques and procedures for learning differences in mode of action of insecticides applied jointly, (2) learn differences in mode of action of insecticides or of chemicals under test for usefulness as insecticides.
Ent. 320
- Fla. Effects of Biocidal Materials on the Physiology of Plants. To correlate metabolic shifts with morphological changes in plants produced as the result of the application of additives such as herbicides, fungicides and insecticides.
Bot. 728
- Ill. Study of the Pharmacologic Activity of Certain Chemical Pesticides. Study (1) effect of chlorinated naphthalenes on pigs; (2) the possible toxic effects of combinations of certain agricultural chemicals on laboratory or other animals.
Vet. Sci. 70-328
- Iowa Radioisotopes as a Tool in Mode-Of Action Studies of Modern Insecticides Used Against the European Corn Borer and Other Agricultural Pests. To (1) determine metabolism of radioactive DDT, alone and combined with synergists, in European corn borer, in house fly, and other resistant and non-resistant strains of insects, and (2) study action, residues, and metabolism of radioactive systemic insecticides in European corn borer, corn plants, the house fly, and the rat.
Zool., Ent. 1256 (NC-19)

- Kans. The Long Range Effects of Insecticides Upon Fecundity and Longevity in House Flies and Other Insects of Medical and Veterinary Importance. To determine alteration in reproductive potential and life span in that segment of an insect population which survives exposure to chlorinated insecticides and organic phosphorus insecticides.
Ent. 249
- Kans. The Relationship Between the Use of Some Chemical Compounds and Cultural Practices on the Vegetative Response and Fruitfulness of Fruit Plants. To determine influence of various chemical compounds used as insecticides, fungicides, herbicides, growth regulators, or fertilizers on the photosynthetic activity, blossom bud formation, fruit production or vegetative characteristics of fruit plants.
Hort. 265
- Kans. Mode of Action of Insecticides. Investigate the following in insects and other animals and plants; (1) Rates and routes of entry and distribution of insecticidal chemicals, (2) intoxication processes, (3) detoxication and excretion mechanisms.
Ent. 476
- La. The Effect of Chemicals Used in Agriculture on the Soil Microflora. To determine effects of herbicides, pesticides, defoliants, etc., upon the microorganisms present in the soils of Louisiana.
Pl. Path., Bot. 837 (S-22)
- Maine Effect of Soil Residues of DDT and Toxaphene on Plant Growth. To determine possible toxic effects to potatoes from continued application to soil and to plants of DDT and toxaphene, especially possible effects on flavor or other quality factors, accumulation and persistence of residues in soil and detection of residues in soil.
Ent., Chem., Agron. 82 Coop. ARS
- Md. Evaluation of Possible Off-Flavors Resulting from the Application of Chemicals on Soils and Growing Crops. To (1) develop efficient, uniform methods for evaluating off-flavors in food; (2) provide screening apparatus for evaluating new chemicals proposed for use on soils and growing crops.
Hort., QH-58-o (NE-15)

- Mass. Effect of Pesticides on Quality of Fruits and Vegetables.
To (1) develop effective methods for detecting differences in flavor which may be caused by pesticides applied to fruits and vegetables before harvest; (2) learn if flavor differences are due to pesticides per se, to decomposition products of pesticides, or changes in food product itself caused by physiological response of plant to the chemical; (3) correlate pesticide or decomposition product residuals with organoleptic analyses; and (4) learn taste threshold values of pesticides and/or their decomposition products.
Food Technol. 71 (NE-15)
- Mich. A Study of the Anti-Mitotic Action of Various Organic Compounds Used as Insecticides, Fungicides and Herbicides. To (1) assess antimitotic and potential mutagenic action of compounds used in insect, fungus and weed control where previous field or chemical studies may suggest that they have such activity; and (2) classify active compounds as to type of antimitotic activity shown on basis of established reactions.
Bot. and Pl. Path. 99
- Miss. Phytotoxicity of Insecticides. To determine toxicity of certain chlorinated hydrocarbons, formulated for insecticidal use, upon growth and quality of vegetable crops grown on same plots for several years and sprayed with recommended strengths of the materials.
Chem., Hort. HF-3, HK-24 Coop. ARS
- Mont. Insect Tissue Composition As Related to the Physiological Action of Toxic Agents. To study the exoskeletal composition of grasshoppers.
Zool.-Ent., Chem. 799
- N. J. Biochemical Research in Insecticides and Their Supplements, Used Under New Jersey Conditions. (1) Develop improved formulations of insecticides; conduct experiments with newer systemics. (2) Learn rate of decomposition of insecticides accumulating in soil, either from direct application, or from sprays and dust; learn longevity of insecticide residues on sprayed and dusted crops. (3) Study conditions and factors in formulations responsible for producing disagreeable taste in tubers and other crops.
Ent., Agr. Chem., Food Technol. 178
- N. J. Fundamental Physiological Studies of Mechanisms of Insecticidal Actions. To study modes of action of various types of insecticides and investigate mechanics of resistance so it will be possible to select materials which will circumvent mechanisms of resistance and to introduce chemicals which will inhibit detoxifying enzymes, thus reducing the insect to its former level of susceptibility.
Ent. 206

- N. Y. (Cornell) Biochemical Investigations of the Mechanisms of Resistance in Insects. (1) To learn which enzyme systems are altered in insect strains which have become resistant to biologically active chemicals. (2) Learn nature of action of resistance invoking chemicals on enzyme function.
Ent. 98
- N. Y. (Cornell) Fundamental Studies of the Normal Physiology of Insect and Comparative Studies of the Abnormal Physiology of Insects Affected by Biologically Active Chemicals. Investigate normal physiology of several insect species; study the action of biologically active chemicals on functional efficiency of their organ systems; compare information gained with object of increasing effectiveness of control material.
Ent. 198
- N. C. Insect Resistance Toward Insecticides. (1) Learn present level of resistance of various insects to insecticides. (2) Study penetration of insecticides thru the integument of insects as a factor in insect resistance to insecticides.
Ent., Chem. 134
- Oreg. Detoxication Mechanisms in Insects. To (1) study detoxication mechanisms of insects, and (2) apply knowledge gained to an understanding of the metabolism of insecticides by insects.
Ent. 90-2
- Pa. The Effects of Ovicidal Materials Upon Insect Eggs. To determine some of the fundamental facts underlying killing of insect embryos thru application of toxic materials.
Zool., Ent. 1185
- Pa. The Physiology and Pharmacology of the Insect Nervous System. (1) Obtain fuller understanding of normal functioning of nervous systems of insects. (2) Elucidate the mode of action of certain insecticides which affect insect nervous system.
Zool., Ent. 1286
- Pa. The Influence of Pesticides on the Flavor of Fruits and Vegetables. Learn influence of various insecticides, fungicides, and herbicides on flavor of fresh, canned, and frozen fruits and vegetables.
Hort. 1332 (NE-15)

- P. R. Fumigation Tests with Methyl Bromide. To determine usefulness and effectiveness of methyl bromide as a fumigant for control of insect pests of crops of Puerto Rico by determining: (1) most economical and effective dosage for control of each insect species; (2) effect of fumigant on plant life when used at rates and methods needed for effective control of respective pests; and (3) practical means, if any, needed to insure safe and effective fumigation with methyl bromide.
Ent. 73
- R. I. A Study of Insecticide Resistance Exhibited by Various Insects of Agricultural Crops. To (1) determine various insect species showing resistance to insecticides under field conditions, (2) obtain fundamental information on nature of such resistance. (3) determine alternate control measures for insects developing resistance to specific insecticides.
Ent., Pl. Path., Chem. 606
- Tenn. Effect of Certain Insecticides and Herbicides Upon the Bio-Chemical Activities of the Soil and Upon Plant Growth. (1) Establish safe limits of concentration of newer types of insecticides that may be incorporated into the soil without adversely affecting microbiological activities in the soil. (2) Learn lethal concentration of insecticides for plant growth; and (3) duration of possible injurious effects from overdosages.
Agron. 54
- Tex. Physiological and Biochemical Effects of Systemic Insecticides on the Cotton Plant. To (1) determine role of the plant in translocation, alteration, and persistence of systemic insecticides, to better understand mechanics of distribution within plant of compounds involved; (2) investigate effect of systemics on plant development, defining dosage levels and conditions at which stimulation or phytotoxicity occurs; (3) determine effect of systemics on plant's organic and inorganic nutrition in relation to their insecticidal effectiveness; and (4) attempt to develop a concept of alterations in chemical structure or systemics which contribute to increased or decreased phytotoxicity.
Pl. Physiol. and Path., Ent. 428 Coop. ARS
- Tex. The Mode of Action of Organic Insecticides as Related to the Nutrition and Metabolism of Insects. (1) Rear selected insects on artificial diets as a means of learning their physiological and biochemical characteristics. (2) Study nutritive requirements and metabolic reactions of insects on chemically defined diets. (3) Test known antimetabolites for their effects on metabolic reactions of insects. (4) Study effects of insecticides and correlate their actions with those of inhibitory substances.
Biochem., Nutr. 790 Coop. ARS

- Tex. Effects of Insecticides on Plants and Soils. To determine the effects of organic insecticides on plants and soils.
Ent. 946 (S-22) Coop. ARS
- Utah The Effects of Residues of Newer Insecticides on Health.
To determine (1) under controlled conditions if insecticide residues appear in human foods of animal origin in toxic quantities, when farm animals consume feeds containing residues of Endrin, Heptachlor and other new insecticides; (2) effects of residues on calves fed milk from cows which have been fed insecticide hay, and when fed known amounts of insecticides mixed with feed; and (3) histological changes in tissues of various species of animal when fed different insecticides.
Anim. Husb., Chem., Dairy Indus., Vet. Sci., Zool.,
Ent. 424 Coop. HEW-Natl. Inst. Health
- Utah Insect Activity in Relation to Fluoride Content of Plants.
(1) Survey areas of fluoride injury to plants for purpose of: learning role of insects in injury of plants, studying insect populations and species on plants injured by fluorine. (2) By greenhouse experiments learn if fluoride level of plant has any direct effect on activity of insects associated with plant under study.
Ent., Pl. Path., Bot. 462
- Va. The Genetics of Resistance to Insecticides in the German Cockroach. To (1) determine if factors for resistance to chlordane in German Cockroach are a. simple or complex, b. associated with sex chromosomes, carried mainly on autosomal chromosomes, transmitted thru cytoplasm, or by a combination; (2) determine if resistance development means selection of predominately homozygotes or heterozygotes for loci concerned, and (3) extend existing knowledge on DDT resistance in relation to outline for chlordane study.
Ent. 86040
- Va. Comparisons of Resistant and Non-Resistant Strains in Two Insect Species. To (1) increase magnitude of resistance to insecticides in selected strains of the German cockroach; (2) compare resistant and non-resistant strains of this cockroach for a. length of time in egg stage, b. length of nymphal period, c. longevity of adults, d. reproductive response of females and e. distinguishing morphological characters; (3) continue development of insecticidally selected strains of large milkweed bug; (4) compare selected and unselected strains of large milkweed bug for a. number of eggs produced, b. order of resistance to insecticides, c. deleterious effects from exposure to insecticides.
Ent. 86059

- Wash. Physiological Factors of Insects Which Determine Their Susceptibility To Systemic Insecticides. To determine why available systemic insecticides are highly effective against some sap feeding pests as aphids, mites, and certain leafhoppers, but fail to control other sucking insects such as scales and mealy bugs.
Ent., Chem. 1228
- Wash. The Synthesis of Radioactive Labeled Systemic Insecticides and Their Plant Metabolic Products. To synthesize labeled systemic insecticides and their decomposition products for use in investigations of the problems involved in application of systemic insecticides to agricultural crops.
Agr. Chem. 1229
- Wash. Action of Organic Phosphates on Enzymes. Study effects of organic phosphates on various mammalian, plant, and insect enzyme systems with emphasis on systemic organic phosphate insecticides.
Chem., Ent. 1277
- W. Va. The Effect of Chemical Spray Schedules on the Quality and Quantity of Apples Produced. To determine (1) effect of various insecticides and fungicides and time of application on the quantity and quality of fruit produced, and (2) relative cumulative as well as current season's effect of various spray schedules on fruit set, yield, color, and finish.
Ent., Pl. Path., Hort. 83 Coop. ARS
- Wis. Biological Activity of Insecticidal Derivatives. To attempt to develop systemic insecticides suited to the individual control conditions present in Wisconsin.
Ent. 822

II. Regional Research

- NC-19 Reduction of the Hazards in the Use of Pesticides. To isolate, define and evaluate certain specific hazards associated with the use of insecticides, fungicides, herbicides and other pesticides to the end that such hazards may be minimized or eliminated.
Cooperating stations and agencies: Ill. I-C, Iowa I-D, Kans. I-C, Mich. I-C, Mo. I-C, Ohio I-C, Wis. I-C, and ARS.
- NC-33 Pesticide Residues on or in Food, Feed and Forage Crops (Their Magnitude, Character, and Persistence). To isolate, define, and evaluate important factors that influence or determine the magnitude and/or persistence of pesticide residues on or in plants and animals under midwestern climatic conditions.
Cooperating stations and agencies: Ill., Iowa, Kans., Ohio, Wis. (all contributing projects in I-C) and ARS.
- NE-15 The Effect of Pesticides on Quality of Fruits and Vegetables.
(1) To develop more efficient, objective and uniform methods of determining quality and more particularly flavor of treated fruits and vegetables. (2) To determine the effect of some pesticides on the quality of selected fruits and vegetables. (3) To devise ways of counteracting effects of pesticides in reducing the quality of selected fruits and vegetables.
Cooperating stations and agencies: Conn. I-C, Maine I-C, Maine I-C, Md. I-D, Mass. I-D, Pa. I-D and ARS. (Revision being considered).
- NE-36 Pesticide Residues in or on Raw Agricultural Commodities.
To determine pesticide residues remaining, particularly at harvest, in or on raw agricultural commodities treated for control of pests either above or below ground, with insecticides, fungicides, bactericides, nematocides and herbicides. Residues of plant growth regulators will also be considered if they are present in or on raw agricultural commodities. To determine whether feeding of forage and grain crops bearing pesticide residues will contaminate meat, milk, poultry and eggs. To develop better analytical methods for the determination of residues, particularly those resulting from pesticides used in combination. To develop suitable and accurate methods of sampling commodities for pesticide residue analysis. To develop a medium for the distribution of pesticide residue information within the region.
Cooperating stations and agencies: Conn., Md., Mass., N. J., NY (Cornell), NY (State), Pa., R. I., (all contributing projects in I-C), and ARS.

S-22

Pesticide Residues - Determinations, Sampling, Effects on Plants and Soils. Standardization and application of chemical and/or biological methods of pesticide residue analysis. Standardization and application of field sampling procedures used in pesticide residue analysis. Evaluation of the effects of pesticide residues on plant growth, plant products and soil.

Cooperating stations and agencies: Ark. I-C, Fla. I-C, Ga. I-C, La. I-D, N. C. I-C, P. R. I-C, S. C. I-C, Tenn. I-C, Tex. I-D, Va. I-C and ARS.

W-45

Pesticide Residues: Their Nature and Determination in Relation to the Production and Marketability of Agricultural Products. To collect, coordinate and make available information concerning residues of pesticides such as insecticides, acaricides, fungicides, bactericides, and herbicides, which are of agricultural importance in the western states. To develop standard procedures for determining pesticide residues, including reliable methods for sampling, extraction, purification, and analysis.

Cooperating stations and agencies: Ariz., Calif., Colo., Wash., (all contributing projects in I-C), and ARS.

LIST OF COMPILATIONS OF FEDERAL-GRANT RESEARCH PROJECTS
AT STATE AGRICULTURAL EXPERIMENT STATIONS

ARS-23-8: Part : Numbers :	Subject-Matter Area	Title of Section
1	Agricultural Chemistry	Agricultural Chemistry
2	Agricultural Economics	a. Prices, Incomes, & General Studies of Com- modities & Industries b. Farm Management c. Land Economics d. Farm Finance & Taxation
3	Agricultural Engineering	a. Land & Water Use & Develop- ment b. Power Machinery & Equipment c. Farm Structures & Materials
4	Animal Husbandry	a. Beef Cattle b. Sheep & Goats c. Swine
5	Dairy Husbandry	Dairy Cattle
6	Dairy Technology	Dairy Technology
7	Entomology & Economic Zoology	a. Field Crop Insects b. Fruit, Nut & Vegetable Insects c. Miscellaneous Insects & Economic Zoology d. Insecticides
8	Field Crops	a. Cereal Crops b. Oil, Fiber, Tobacco & Sugar Crops
9	Food Science & Technology	a. Food Chemistry, Micro- biology, Sanitation & Public Health b. Food Engineering, Processing, Product and Process Develop- ment, Utilization and Waste Disposal c. Food Quality & Standards, Acceptance, Preference, & Marketing
10	Forage Crops, Pastures & Ranges	Forage Crops, Pastures & Ranges
11	Forestry	Forestry

ARS-23-8:		
Part :	Subject-Matter Area	Title of Section
Numbers :		
12	Fruits & Nuts	Fruits & Nuts
13	Home Economics	<ul style="list-style-type: none"> a. Human Nutrition b. Housing c. Clothing & Textiles d. Foods-Consumer Quality & Utilization e. Household Economics & Management
14	Economics of Marketing	<ul style="list-style-type: none"> a. Field Crops b. Fruits & Vegetables c. Livestock, Meats & Wool d. Dairy Products e. Poultry & Poultry Products f. Forest Products & Ornamental & Drug Plants g. Cross-Commodity & Functional Studies
15	Meteorology	Meteorology
16	Ornamental & Drug Plants	Ornamental & Drug Plants
17	Plant Pathology & Bacteriology	<ul style="list-style-type: none"> a. Plant Pathology, Botany, & Diseases of Miscellaneous Crops b. Diseases of Field Crops c. Diseases of Fruit Crops d. Diseases of Vegetable Crops
18	Plant Physiology & Nutrition	Plant Physiology & Nutrition
19	Poultry Industry	Poultry Industry
20	Rural Sociology	Rural Life Studies
21	Soils	<ul style="list-style-type: none"> a. Soil Chemistry & Microbiology b. Soil Fertility, Management & Soil-Plant Relationships c. Soil Physical Properties, Conservation & Classification
22	Vegetables	<ul style="list-style-type: none"> a. Vegetable Crops b. Potatoes
23	Veterinary Science	Veterinary Science
24	Weeds	Weed Control

