A PROPOSAL

FOR

TITLE V FUNDS

RURAL DEVELOPMENT ACT OF 1972

FOR PROJECT ENTITLED

POULTRY INSECT PEST MANAGEMENT IN RELATION TO RURAL COMMUNITY HEALTH AND DEVELOPMENT

Covering the Period 1 October, 1976 to 30 September, 1977

Requesting Support in the Amount of $ 18,300 Research

$ 6,443 Extension

$ 24,743 Total

Submitted by

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N.C. Agricultural Extension Service

Poultry Insect Pest Management In
Relation to Rural Community Health and Development

Continuation Proposal

This proposal is to provide for the continuation of the project on Poultry Insect Pest Management begun under Title V funds previously approved for FY 1976. The original proposal contains documentation of the rationale underlying this proposal and an explanation of the problem and the project objectives. The major objective is to conduct research, provide educational information and demonstrate the effective control of flies, mosquitoes and other pests in poultry production, especially caged laying hen operations. These objectives require long-term data collection in order to obtain statistically reliable conclusions and reliable recommendations. Funds will be needed in FY's 1977, 78 and 79 at about the same level as being requested for FY 1977. In the last year a greater part of the funds will be in the extension component to insure implementation of the project results.

Progress Report

(as of November 1, 1976)

1. Survey of poultry fly problems. Half (15) of the 29 counties in North Carolina having large egg production (over 2 million dozen eggs in 1975) have been visited and representative farms examined. In the West the counties are: Burke, Catawba, Cherokee, Clay, Cleveland, Lincoln and Rutherford. In the Piedmont the counties are: Chatham, Granville, Orange and Alamance. In the East the counties are: Craven, Pitt, Duplin and Lenoir. This involves a total of about 60 farms. This survey provides a valuable base for achieving relevance in the research-extension planning.

2. Biological control agents. At a majority of the farms surveyed, collections of parasites and predators of the house fly were attempted. In some locations the populations of these biological control agents were large. The following parasites of the house fly have been found in the counties indicated:

Spalangia cameroni - Chatham, Cleveland
Spalangia endius - Chatham
Spalangia nigroaenea - Chatham, Craven
Muscidifurax raptor(?) - Chatham, Clay, Cleveland, Craven
Pachycrepoideus spp. - Cleveland
Trichopria spp(?) - Chatham

The last parasite attacks the fly larva while all the others are small hymenopteran parasites which develop in the fly pupa.

Various predators which feed on fly eggs and/or larvae have been found. Although these collections are not entirely examined, the most important predators appear to be as follows:

Histerid beetles:	Carcinops pumilio
	Dendrophilus sp.
	Gnathoncus nanus
	Hister spp.
Staplylinid beetles:	Alevchara sp.
	Lathropinus sp.
Tenebrinid beetles:	unknown species
Mites (Acarina):	Macrochelidae
	Uropodidae

Work is continuing on processing the collections of parasites and predators and determining the identity of the species.

3. Experimental colonies. To accomplish laboratory experiments and to prepare for eventual field releases of promising biological control agents, it is necessary to have cultures of the organisms involved. A laboratory colony of the house fly has been established from flies collected in Chatham County. Laboratory cultures of the following parasites of the house fly have been established:

Spalangia endius - from California
Spalangia nigroaenea - from North Carolina
Muscidifurax raptor - from North Carolina
Muscidifurax uniraptor - from Puerto Rico
Muscidifurax raptorellus - from Chile

Other parasite strains will be established and all these evaluated to select the species and strains which are most promising as fly control agents under conditions in North Carolina.

In this initial survey of biological control agents in North Carolina, sampling techniques have been developed and refined so that more efficient and reliable parasite sampling can be accomplished in the future.

4. Chemical control agents. A field experiment has been completed to evaluate an insect growth regulator (Dimilin®) as a larvicide for fly control under caged hens. Effective control was achieved for 7 days. Further testing with this and other chemical agents and on how these agents can be used in a manner compatible with the use of biological control agents is expected depending upon progress on other aspects of the project.

5. Preparation of informational materials. Work is in progress in compiling all available information on fly control in relation to poultry production, on mosquito control in relation to manure disposal in lagoons and on the biology and control of the northern fowl mite. From this data bank, and from our own research and survey data, it will be possible to prepare meaningful informational materials to provide guidelines on these problems in poultry production. It is necessary to proceed with deliberation on this to be sure that the information is relevant to the real situation in North Carolina.

Work Planned

The project will continue under the guidelines and objectives delineated in the original proposal. The following specific work units are in progress or will be initiated in FY 1977.

1. Biological control of flies. The comprehensive sampling and evaluation of the effectiveness of parasites of the house fly will continue. The most promising species will be reared in large numbers and released in the experimental poultry houses and later on cooperating farms to determine the practicality of using the parasites in a fly management program.

2. Chemical control of flies. The effects of insecticides and application methods on the biological control agents attacking flies will be examined in order to develop guidelines for the use of chemical control measures in a manner least descriptive to the biological control agents. Evaluation of types of fly attractants and baits will be included.

3. Manure management. Experiments are planned to measure the manure characteristics (moisture, temperature, pH, etc.) affecting fly production and the effects of various manure management practices on the drying, cone-formation and suppression of fly development in the manure. The proper environmental monitoring devices and adequate field facilities are being developed for these experiments.

4. Housing design versus fly problem. The succession of arthropod fauna in the accumulated manure and the relationships to the degree of the fly problem will be determined in high-rise houses. This will be accomplished on cooperating farms with houses of different ages and amounts of manure accumulation. Data will be required for up to a 3 year period to properly evaluate these high-rise houses.

5. Informational materials and fly control demonstrations. In the continuation period it is planned to issue extension information on fly control in different types of poultry housing and on the northern fowl mite to provide practical guidance to producers, egg contractors, county extension personnel and sanitarians. Application of these guidelines on cooperating farms will be demonstrated with close supervision from the project personnel.

Period of Work

This project was initially funded with Fiscal Year 1976 funds. The budget submitted with this "continuation proposal" provides for Fiscal Year 1977 funds. The budget provides for continuation of the support of personnel already on the project.

Professional Personnel and Location

The principal investigator for this project is Dr. R. C. Axtell, Professor of Entomology. Personnel with the project are: D. A. Rutz, (Research Associate), D. Pfeiffer (Graduate Research Assistant) and temporary hourly employees. Dr. Rutz is responsible for the daily operation of the project. Closely assisting and collaborating with the project are Dr. G. A. Martin and Dr. Tom Carter of the Department of Poultry Science and Dr. L. B. Driggers and Dr. G. Baughman of the Department of Biological and Agricultural Engineering. All are personnel of the School of Agriculture and Life Sciences of North Carolina State University. The project is conducted in facilities of North Carolina Agricultural Experiment Station in cooperation with the North Carolina Agricultural Extension Service.

TITLE V FUNDS IN FY 1977 AND FUNDS CARRIED OVER FROM FY 76 BEING USED IN FY 77*

U.S. DEPARTMENT OF AGRICULTURE

BUDGET STATEMENT RESEARCH AND EXTENSION SERVICE
TITLE V RURAL DEVELOPMENT ACT OF 1972 (P.L. 92-419)

STATE OR REGION	PROGRAM TITLE
North Carolina	Poultry Insect Pest Management in Relation to Rural Community Health and Development

1. PERSONNEL:	RESEARCH COMPONENT (MYE)	RESEARCH COMPONENT AMOUNT	EXTENSION COMPONENT (MYE)	EXTENSION COMPONENT AMOUNT
(A) PROFESSIONAL-SCIENTIST RESEARCH (NAME AND TITLES)		$		$
Research Associate - D. A. Lutz	.5	2,000	.5	2,000
(B) PROFESSIONAL SUPPORT				
Graduate Research Assistant	1	10,500		
(D) CLERICAL LABOR AND OTHER (Hourly Labor)	.1	500	.3	1,500
2. PERSONNEL SUBTOTAL		(29,712) $ 42,712		(14,145) $ 17,645
3. TRAVEL		3,059		2,230
4. EQUIPMENT		6,249		
5. OTHER OPERATING EXPENSES (IDENTIFY LARGE ITEMS)				
Fringe Benefits		2,303		1,839
Supplies, computer, publications, visual aid & equip. maintenance		14,048		7,100
6. SUBTOTAL		(20,359) $ 25,659		(8,226) $ 11,169
7. COOPERATIVE AGREEMENTS, CONTRACTS OR GRANTS WITH OTHER INSTITUTIONS:				
INSTITUTION SALARY MYE TRAVEL EQUIP. OTHER				
EXT				
RES				
EXT				
RES				
EXT				
RES				
8. GRAND TOTAL **		(50,071) $ 68,371		(22,371) $ 28,814

*Numbers in parenthesis ( ) equals funds carried over from FY 76 being expended in FY 77.

**Includes FY 76 carryover funds of $50,071 for research and $22,371 for Extension.

FORM AD 458 (8-73)

U.S. DEPARTMENT OF AGRICULTURE

Funds From Other Sources Only

BUDGET STATEMENT RESEARCH AND EXTENSION SERVICE
TITLE V RURAL DEVELOPMENT ACT OF 1972 (P.L. 92-419)

STATE OR REGION	PROGRAM TITLE
North Carolina	Poultry Insect Pest Management in Relation to Rural Community Health and Development

1. PERSONNEL:	RESEARCH COMPONENT (MYE)	RESEARCH COMPONENT AMOUNT	EXTENSION COMPONENT (MYE)	EXTENSION COMPONENT AMOUNT
(A) PROFESSIONAL-SCIENTIST RESEARCH (NAME AND TITLES)		$		$
R. C. Axtell, Professor (Entomology)	.3	8,100		
G. A. Martin, Professor (Poultry Science)			.15	2,500
L. B. Driggers, Assoc. Prof. (Agric. Engineering)			.15	2,500
(B) PROFESSIONAL SUPPORT				
(C) Technician	.3	3,400		
(D) CLERICAL LABOR AND OTHER		1,000		1,000
2. PERSONNEL SUBTOTAL		$ 12,500		$ 6,000
3. TRAVEL				500
4. EQUIPMENT				
5. OTHER OPERATING EXPENSES (IDENTIFY LARGE ITEMS)				
Fringe Benefits (17% S & W)		2,125		1,020
Communications, Supplies, Facilities & Other Expense		2,500		1,600
6. SUBTOTAL		$ 4,625		$ 2,620
7. COOPERATIVE AGREEMENTS, CONTRACTS OR GRANTS WITH OTHER INSTITUTIONS:				
INSTITUTION SALARY MYE TRAVEL EQUIP. OTHER				
EXT				
RES				
EXT				
RES				
EXT				
RES				
8. GRAND TOTAL		$ 17,125		$ 9,120

FORM AD 458 (8-73)