BEFORE USING ANY PESTICIDE
STOP
READ THE LABEL
make
CHEMICALS
work for you
Row Crops

Row Crop-1  Boom spraying corn

Row Crop-2  Boom spraying cotton

Row Crop-3  Band spraying while planting corn

Row Crop-4  Boom spraying corn

Row Crop-5  Air carrier spraying of potatoes
THE LOCATION

North Carolina offers unique advantages in locale for field and laboratory studies in insect and plant disease control.

1. Almost all of the major crops such as corn, tobacco, cotton, peanuts, small grains and vegetable crops are produced in the state, as well as orchard crops. Tobacco has six insect pests and at least two fungus diseases. Cotton has at least five major insect pests and corn has at least eight insect pests. Small grains have three major insects pests and seven fungus diseases.

2. The length of the growing season amplifies the problem in allowing time for a greater number of generations of insects to be produced in one season.

3. Funds have been appropriated recently for the completion of a new Agricultural Engineering Building. A laboratory for fundamental research in Farm Machinery is to be incorporated therein. It is envisioned that such a laboratory will have precise control over the environmental factors and over a range at least equal to those experienced in nature. Environmental factors are among the variables significantly affecting deposition and control. Further, such a laboratory will be of sufficient dimensions to accommodate the growing plant. Such facilities are pertinent to the development of new knowledge in pesticide application for major studies in the engineering aspects of this important production operation. To our knowledge there is no laboratory in the United States available for such a refined study, as herein envisioned.

4. Entomological work by both federal and state is presently being carried out in North Carolina. In Raleigh the following projects are currently underway:

(a) HN-14 - The control of insects affecting stored grain.

(b) H-42 - Biology, ecology and control of insects affecting peaches and apples.

(c) H-43 - The control of cotton insects in North Carolina.

(d) H-44 - The ecology, cultural and chemical control of insects attacking field corn.

(e) H-45 - Biology and control of insects and mites affecting vegetable crops.
Communication and cooperation between the disciplines especially entomology and engineering is essential and is anticipated in this case.

5. The theoretical consideration of this problem is important and necessitates the use of a digital computer which is available at N. C. State College. The use of a desk calculation is impossible because of the amount of time involved. Further, the department of Experimental Statistics is outstanding and can render effective cooperation in setting up and evaluating experiments.

6. Lastly, there is a community of outstanding scientists at N. C. State College that could be utilized for consultation on this problem. Among those should be mentioned Dr. Henry Bowen and Dr. William Splinter, both nationally recognized authorities in the matter of electrostatic charging of dust particles.
Need for Research on
EQUIPMENT FOR THE APPLICATION OF PEST-CONTROL CHEMICALS

Equipment is an essential link in the effective use of all chemicals applied for the control of all types of crop pests. The effectiveness and cost of any pest-control program is to a great extent determined by the suitability and efficiency of the application equipment available.

A large number of companies manufacture a great variety of application equipment. The value of such equipment produced in 1955 is estimated at $32,622,000. Performance of this equipment in many instances leaves much to be desired from the standpoint of (1) accurate control of application rates, (2) control of points of application and drift, and (3) initial and maintenance cost. Research on application equipment is needed (1) to improve pest control, (2) to reduce waste of chemicals, (3) to reduce undesirable dispersal (drift), and (4) to reduce cost of labor and equipment.

The annual losses to agriculture resulting from disease, insects, and weeds are estimated at more than 7 billion dollars. An improvement in application equipment which would reduce these losses by only one per cent would result in an annual saving of 70 million dollars. The annual cost of chemicals used for pest control alone is estimated at more than $500,000,000. Improving equipment to give more accurate control of application rate and more uniform application might well reduce the chemicals needed for a given application by 5 to 10 per cent. Such improvements would result in a saving of $25,000,000 to $50,000,000. Furthermore, accurately controlled and uniform application of chemicals for pest control would materially assist in solving the serious problem of excessive residues.

The problem of equipment for most effective application of chemicals for pest control is very complex and involves both basic and applied research. There is urgent need for more effective means of producing spray droplets of uniform and controlled size, and for developing a new method of using electrostatic forces to improve the adhesion of chemicals to crops sprayed.

Each combination of (1) pest, (2) crops, (3) chemical, (4) season, (5) air movement, (6) temperature, (7) humidity, and (8) equipment (aerial, ground, subsurface) presents a different application problem. Because there are continual developments and changes in many of these variables, there is continuing need for engineering research to accompany the research by entomologists and plant and soil scientists.

Research on the problem of determining the basic equipment requirements for given sets of conditions can frequently be conducted more effectively and at lower cost by public research agencies because of facilities already available for other fields of research, such as land, laboratories, special research equipment, scientific instruments, and teams of research technicians from many fields of science. In most cases, the value of such research to farmers and society will justify its cost, which could not be carried by private industry alone.