

Proceedings of the Southern Weed Conference

# PROCEEDINGS

## Sixteenth Annual Meeting of the Southern Weed Conference

January 16, 17, 18, 1963  
Mobile, Alabama

*Harry M. Howell*

## Presidential Address

### OPPORTUNITIES AND RESPONSIBILITIES IN WEED CONTROL

By John T. Holstun, Jr.

Agronomist, Crops Research Division, Agricultural Research Service,  
U. S. Department of Agriculture in cooperation with the  
Mississippi Agricultural Experiment Station,  
Stoneville, Mississippi

Weed control offers a wide range of opportunities and requires heavy responsibilities. How well we respond to these responsibilities will determine the advantages we realize from the opportunities. Unusual opportunities are available to herbicide users, sellers and manufacturers of herbicides and application equipment, extension workers, and research personnel in industry and public service institutions.

What are these opportunities? Proper use of modern weed control techniques offers the opportunity to realize the following advantages.

1. Release of a vast number of people now performing manual labor in weed control to more productive occupations.
2. Higher wages to labor resulting from reduced manual-labor requirements and increased need for skilled labor.
3. Lower costs of production and maintenance for agricultural and non-agricultural industries where weeds must be controlled.
4. Increased plant and animal production per land unit.
5. Improved quality of plant and animal products.
6. Reduction in health hazards as allergy-producing and insect-harboring weeds are controlled.
7. Esthetic improvements along roads, on farms, in lakes, in parks, and other places.
8. Abundant supplies of high-quality, low-cost plant and animal products.
9. High-pay employment of a large number of personnel engaged in the production, transportation, and marketing of herbicides and weed control equipment.
10. Personal satisfaction, professional recognition, and financial compensation for a diverse group of research, extension, and educational personnel in industry and public service institutions.

These, in general, are the opportunities we have. What then, are our responsibilities? Briefly, there are but two:

1. We are responsible for the maximum proper usage of modern techniques to obtain the greatest benefits for all concerned.
2. We are responsible for preventing the mis-use of weed control techniques which might injure some or which could result in the abolishment of opportunities for all.

From time to time chemicals and machinery are accused of creating unemployment, creating surpluses, poisoning food, ruining land, polluting the atmosphere, killing the users, destroying wildlife, and upsetting genetics. In individual cases such accusations may be true, partially true, true but distorted, or completely false. The accuser may be acting in hysteria, in ignorance, in malice, or calmly in good faith on well established facts.

Accurate judgment of these accusations, both true and false, must be based on scientific data. The responsibility for obtaining such data is primarily that of personnel in weed control. Ridicule, unsupported angry denials, and ignoring of these accusations will solve nothing. Regulation of pesticide usage is necessary for the protection of all concerned. Each of us has a responsibility to protest unsound regulation and the responsibility of refraining from unjust criticism of that which is necessary and sound. Further, each of us has the responsibility for encouraging compliance with legal regulations concerning pesticides -- whether the regulations, in our opinion, are unsound or sound.

In addition to many wonderful advances, mistakes have been made in the development of herbicides and equipment for control of weeds. Recommendations have been premature in some cases, and unduly delayed in others. Some products have been over-sold, and some undersold. Research data and instructions have sometimes been inadequate for the introduction of new practices. The users of herbicides and weed control equipment have not always been provided with the best available information nor have they always used wisely that information which was provided. The prices of a few herbicides have appeared too high, especially in early stages of development. Herbicides and equipment developed for one purpose have been used for other purposes for which they were not satisfactory. In many cases such mis-use is illegal, and is usually an extremely high-risk practice.

These are human problems. Probably not one of us can plead innocent to all such errors. Unfortunately each major blunder, regardless of the identity of the blunderer, injures not only those directly concerned, but also damages the entire program of chemical-mechanical control of weeds. Progress will not be stopped by one mistake, but each error made provides critics with ammunition and decreases the overall confidence in our abilities. Although we cannot hope to avoid making some mistakes, we can reduce the number through individual adoption of a fairly simple four-point code. These four points are as follow:

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1. Introduce into general use new products, practices, or equipment immediately after, but not before, adequate research has proved it safe, effective, advantageous, and dependable within a reasonable range of conditions. Safety with respect to residues in food or soils, to adjacent property, and to the general public must be established.
2. Prepare adequate and clear instructions for the use of each new product or practice in the form of recommendations and labels. Such instructions should thoroughly and accurately outline the results which can reasonably be expected by proper usage of the product, and should refrain from inaccurate and unsubstantiated claims. Known limitations should be clearly specified.
3. Take full advantage of the research paid for by tax dollars, industry, and private agents through careful use of published reports, recommendations, and labels. Avoid extensive premature usage of chemicals and machinery based only on unevaluated theories of individuals or organizations.
4. Buy and sell competitively, but only by the well established rule -- do unto others as you would have them do unto you.

We have an important responsibility to see that there are well-trained men for future work in the field of weed control. Much has already been said on this subject by very able men. I would just like to add these few thoughts to theirs. Our work, all phases of it, is rewarding, honorable, and vital to the economy of our nation. We need to show this by our words and actions now being observed by the young men and women who will replace us -- or choose other fields. Dignified and factual explanations of the many facets of our field to students, young job-seekers, and the general public are essential to the future of weed control. Let us tell our youth that we have made a successful beginning, that we intend to continue succeeding, and that we will need the best of them to assist our future efforts. We must make certain they are aware of the many different opportunities our field has for them.

#### Summary

The field of weed control offers us almost unlimited opportunity -- provided we are willing to shoulder our responsibilities. These responsibilities will require that we give serious consideration to continuance of education in our field, and that we:

1. Conduct adequate research before introducing new compounds, practices, or equipment of general use.
2. Prepare accurate descriptions and use-instructions for each new introduction.
3. Take full advantage of research findings by conforming to recommendations and instructions.

4. Conduct our operations of selling and buying competitively, but with the highest possible ethics.

These responsibilities must become a personal concern with each one of us if we are to progress at a reasonable rate. Individual responsibilities cannot be left to others; no person should have to carry more than his own.

These remarks have been directed to each of us as individuals -- as a research scientist I truly hope that I can keep my own comments in mind, and have the courage and integrity to stand by my own firm convictions.

## WINNING ESSAY

### SOME CAREER OPPORTUNITIES IN THE AREA OF CHEMICAL WEED CONTROL

Nyal Dwight Camper  
North Carolina State College  
Raleigh, N. C.

Man has carried the burden of weed control primarily by brute force for as long as he has been involved in organized crop production. Human labor has been largely replaced by animal and tractor energy. Chemical energy is now gradually replacing the brute-force energy of animals and tractors. Used together, they have the potential of eliminating the hoe. Also they may greatly improve the efficiency of farm labor in crop production.

Weeds are not to be associated with any particular botanical family (2); they may be defined as plants growing where they are unwanted or plants out of place (1). Under certain circumstances a crop plant may be considered a weed such as the presence of volunteer corn in a field of peanuts or cotton.

Weed control is an acute problem in farming. The science of weed control has advanced more since 1942 when the growth-regulating effect of 2,4-dichlorophenoxyacetic acid (2,4-D) was reported than in the previous one hundred centuries (1). Chemical methods of weed control employed at the present time are the results of the combined efforts in research by state and federal agencies, industry, and private institutions. The work accomplished to date in this area required the skills of men trained in a wide variety of disciplines including agronomy, animal husbandry, chemistry, entomology, medicine, pharmacology, plant physiology, and wildlife.

Although the first successful attempts at selective chemical weed control were accomplished about 1895 (2), the full impact of chemical weed control was not apparent until the first large-scale farm treatments with 2,4-D were made in 1947 (1). The impetus of this trend toward replacement of mechanical energy with chemical energy to control weeds, has grown rapidly. At the present many career opportunities are available in this area and will become even more plentiful in the future.

Career opportunities in the area of discovery and development of herbicides may be grouped into two general categories; first, the aspect of discovering and developing new herbicides along with agricultural adaptations of these tools, second fundamental research involved in determining how the herbicide controls growth. The first category will be discussed first.

Many new herbicides or potential herbicides are synthesized each year. Synthesis and development of a new herbicide usually re-

quires from five to ten years of a full-scale developmental program and costs range from \$500,000 to \$3,250,000 (1). This full-scale developmental program requires the skills of many trained personnel and thus offers many varied opportunities for careers in this area. These new chemicals are synthesized by organic and/or inorganic chemists. Synthesis of new compounds also involves the work of laboratory technicians and other laboratory personnel. Although these personnel are routinely employed in a chemical laboratory, they nevertheless play a role in the synthesis of a new herbicide. Following the initial synthesis, additional personnel must formulate the material into an easily applied compound.

New compounds are screened and evaluated for their phytotoxic effects as well as their possible applications as insecticides, fungicides, and drugs. Technicians engaged in screening work are faced with many problems such as solubility of the chemical, method of application, and test species. Obviously such a position requires individuals with a chemistry background and a working knowledge of greenhouse techniques. Training in chemistry, botany, and crop science enables these persons to work in the area directly involved with herbicides, and also in areas such as medical research, agricultural research, and industrial research.

If a compound shows promising phytotoxic effects upon plants, it is distributed as an experimental sample to field stations and various other research facilities to be investigated on a larger scale both under field and greenhouse conditions. Agronomists, horticulturists, and physiologists are all involved in this aspect of development of a herbicide. These groups are responsible for developing much of the technical know-how for use - safety to the applicator, safety to consumers of foods, and safety to wildlife. Cooperative endeavors by universities and industry in such programs provide creative opportunities for application of their recently studied sciences to this new area of research.

During the course of field testing, residue tests are being conducted simultaneously. Plant and soil residue samples are collected to be analyzed for presence of the herbicide. Determination of residues involves the analytical chemist, soil scientist and others. New compounds are also screened for their toxicity to animals and humans. Toxicity studies involve highly trained personnel such as veterinarians, medical research scientists, and pharmacologists.

The second general area of career opportunities in chemical weed control is in the area of determining how the herbicide kills the plant. This research is undertaken to solve such problems as the following; in what form does a herbicide molecule express its activity, how many molecules of the herbicide are necessary to produce this activity, what constitutes the site of action in the plant, and translocation of the herbicide molecule to the active site in the plant.

The problem of elucidating the mechanism of action of the herbicides is very complex, and previous studies have failed to reveal the mechanism as being one single response, but rather a series of physiological processes. These studies involve many scientific disciplines. The plant physiologist is concerned with the complex physiological processes involved, and closely related is the chemist and biochemist. Both the biochemist and physiologist are interested in the identification of the site of action in the plant of the herbicide, the active form of the herbicide molecule, translocation of the herbicide molecule to the active site in the plant, and transformation and/or degradation of the herbicide within the plant. The organic chemist may be involved in the synthesis of analogs of the herbicide which could be used to determine what part of the molecule is involved in the action. The enzyme chemist or enzymologist plays a very important role in studying the effect of the herbicide on a particular system or systems of the plant and elucidating the mechanism of action. The soil chemist is also involved in determining the fate of the herbicide in the soil and how different soil conditions affect the action of the chemical. The physicist may be involved in the study of these soil factors. As the science of chemical weed control advances the physical chemist will become more involved in elucidating the mechanism of herbicidal activity.

Information obtained from the course of research may prove to be an aid in predicting phytotoxic activity of the herbicide on the basis of molecular structure. Results may be such that the synthesis of new compounds will be directed to have specific effects on a particular plant system. Selective herbicides are now in use, but in the future this selectivity may be further improved so that a specific herbicide may be used for the control of particular plants other than a crop plant. The information obtained in research as to molecular requirements for action can be of great value to the synthetic chemist, and possibly eliminate some of the guess-work in synthesizing and development of a new herbicide.

The positions mentioned above present opportunities for highly-trained persons. These individuals have the opportunity of applying all the fundamentals of these sciences and their knowledge and skills toward the solution of some of the many problems ahead of us.

The science of weed control is fast becoming a separate discipline. The career opportunities in this area are virtually unlimited for highly trained people. Although this paper primarily deals with opportunities and areas involved in chemical weed control there are numerous opportunities in other phases of weed control. The fact that some disciplines that are involved in chemical weed control are not mentioned, does not mean that they are not equally important. Only by cooperation between all of the scientific areas involved can the problems be solved and the potential of the science be realized.



The personnel employed in the area of weed control must have a broad fundamental training in chemical, physical, botanical, and statistical sciences plus crops, horticultural, soil and animal sciences. In addition these personnel must have practical experience for the full development and appreciation of the need for training in the above sciences.

There is no question as to weed control being a science. A few results are beginning to be seen in this area, but the future will produce many great advances. Perhaps no other science offers greater potential service to agriculture during the next 50 years (1).

#### Literature Citations

1. Klingman, G. C. 1961. Weed Control: As A Science. John Wiley & Sons, Inc., New York.
2. Willard, C. J. 1954. Weed Control: Past, Present, Prospects. Agron. J. 46: 481-484.

MINUTES OF THE BUSINESS MEETING  
SOUTHERN WEED CONFERENCE

Admiral Semmes Hotel  
Mobile, Alabama  
January 17, 1963

The meeting was called to order at 1:10 by President John T. Holstun, Jr.

Dr. Holstun asked for approval of the minutes of the business meeting as printed in the proceedings from the 1962 meeting. It was moved, seconded, and passed that these minutes be approved as printed.

LOCATIONS FOR 1964 AND 1965 MEETINGS

Dr. Holstun reported that the 1964 meeting would be held in the Hotel Heidelberg, Jackson, Mississippi on January 15, 16, and 17, 1964. He stated that the 1965 meeting would be held in the Hotel Adolphus, Dallas, Texas on January 19, 20, and 21, 1965.

TREASURER'S REPORT

Southern Weed Conference  
Financial Statement  
Conference Year 1962

ASSETS:

Carry Over		
Checking Account	\$ 124.49	
Reserve funds in- vested	3,378.32	
Scholarship fund	1,288.19	
Total		\$4,791.00
Receipts at 1962 Meeting		
Banquet	\$ 595.00	
Registration Desk	2,063.00	
Total		\$2,658.00
Sale of Proceedings		\$1,153.61
Sustaining Members		1,895.00
Interest on invested-money		194.64
Contributions for re-typing stencils		28.76
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		\$10,720.99

EXPENDITURES:

1962 Meeting		
Banquet	\$ 644.00	
Registration and		
Executive Board		
expenses	112.69	
Publicity photos	20.00	
Printing of programs	232.58	
Public relation		
expenses	49.36	
Total		\$1,058.63
Preparation of 1962 Research Report		134.00
Production of 1962 Proceedings		1,645.17
Secretarial Supplies and Services		107.15
Badges for 1963		21.00
Preparation of 1963 Research Report		887.94
Student Interest Committee Expenditure		314.85
Program Committee Expenditures		239.05
Total		<u>4,407.79</u>
Funds on hand	\$ 440.46	
Reserve funds	3,001.95	
Scholarship funds	2,870.79	
Total		\$6,313.20
		<u><u>\$10,720.99</u></u>

APPROVED:

Auditing Committee  
/S/ Roy Bailey  
/S/ Rex W. Millhollon

Respectfully submitted,  
/S/ Robert E. Frans  
Secretary-Treasurer  
Southern Weed Conference

The treasurer's report was presented by R. E. Frans .

Don Davis moved that the conference go on record as commending Dr. Frans on his excellent service for the past three years. It was seconded, passed with a tremendous applause, and put on record. (This is the record.) President Holstun then called for Roy Bailey to present the auditors report.

REPORT OF THE AUDITING COMMITTEE

The Auditing Committee of the Southern Weed Conference met on January 17, 1963, with R. E. Frans, Secretary-Treasurer of the conference and audited the conference financial records for the 1962 conference year.

Receipts and expenditures were found to be duly recorded and documented and all expenditures were deemed to be in accordance with the traditional obligation of the conference. The Auditing Committee recommends that the conference approve the financial transaction made by R. E. Frans for the conference during the 1962 conference year.

Respectfully submitted,

/S/ Roy Bailey, Chairman  
Rex Millhollon  
R. S. Baker

Russell Richards moved that the report be adopted by the conference. It was seconded and passed unanimously.

J. F. Freeman moved that tobacco be included in the research report. This motion was seconded and passed.

#### STUDENT INTEREST COMMITTEE'S REPORT

The Student Interest Committee met April 30, 1962 to formulate plans for the 1962 efforts. It was agreed that the committee should be given prime consideration and that a handbook for use in stimulating student interest at the high school level should be developed. These plans were approved by the Executive Committee and the committee proceeded to execute these plans.

A brochure announcing the essay contest was printed and put in the mail the first of August. Copies of this brochure were sent to 394 colleges in the area of the Southern Weed Conference and to the membership of the conference. The final result of this contest is the appearance of the four winners at the conference. These men are:

1st prize	N. D. Camper
2nd prize	A. B. Rogerson
3rd prize	H. R. Bayless
4th prize	Randall Jones

Work on the handbook was started, but there is still much work to be done on this project.

Respectfully submitted,

G. H. Beames  
H. H. Funderburk  
E. G. Rodgers  
/s/ J. B. Baker

John Baker presented the Student Interest Committee's Report. John Baker moved that the report be accepted. It was seconded and passed.

#### TERMINOLOGY COMMITTEE'S REPORT

Sharon McIntire presented the Terminology Committee's Report.

##### I. PURPOSE OF THE COMMITTEE

To serve as a liaison agent between members of the Southern Weed Conference and the Terminology Committee of the Weed Society of America.