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Proceedings

TENTH ANNUAL MEETING

of the

SOUTHERN WEED CONFERENCE

JANUARY 23, 24, 25, 1957

AUGUSTA, GEORGIA

PREFACE

These Proceedings of the Tenth Annual Meeting of the Southern Weed Conference held January 23, 24, 25, 1957 in Augusta, Georgia include formal papers, the report of the Research Committee, minutes of the business meeting, and lists of registrants and sustaining members.

Additional copies of these Proceedings are available at \$3.50 per copy from the Conference Secretary-Treasurer. Proceedings of Conference meetings held in 1950, 1952, 1953, 1954 are available at \$2.00 per copy per year and Proceedings of the 1955 and 1956 meetings at \$3.50 per copy.

Permission to reproduce any part of the Research Committee Report should be secured from the Executive Committee. Permission to reproduce data from papers in any Proceedings of the Southern Weed Conference should be secured from the respective author(s).

The MBC's of Weed Control: Its Mechanical (M),
Biological (B) and Chemical (C) Aspects.

W. B. Albert
Clemson College, South Carolina

190 In its broad aspects, the control of weeds, i.e., the control of
193 plants that interfere with the activities of man, may be regarded as the
product of such mechanical, biological and chemical methods as have been
used on the many complex problems involved in control of unwanted plants.

204 References to the importance of weeds in human affairs can be found
in ancient historical writings and the ancient civilizations had weed
213 problems. In our current civilization the number and severity of such
problems has probably not decreased.

219 Current estimates of the annual costs of weeds to the United States
alone are in the order of 5 billion dollars. Allowing for a margin of
223 error inherent in estimates of this nature, the fact remains that the con-
trol and lack of control of weeds is the most costly item in agricultural
226 production, exceeding the losses caused by insects, diseases and other
pests. In terms of the individual, the sum of 5 billion dollars represents
232 the sum of approximately 30 dollars per person in the United States. Con-
sidering the cost of living insofar as food, fibres, paper, lumber and
237 other agricultural products are concerned, such an amount appears reason-
able. If these losses of 5 billions annually are capitalized at 5 per cent
237 we arrive at the sum of 100 billions as a permanent investment of negative
and harmful value.

242 The vigorous development and growth of plants that are usually weeds
254 should not always be regarded as an unmitigated evil. One has but to travel
through areas poisoned or sterilized by industrial installations to appreci-
255 ate that vegetation, whether composed of useful plants or of plants usually
considered as being of no value, has many important functions. The desig-
260 nation of weeds as "guardians of the soil", is, therefore, not inappropriate
although if the previous definition of weeds as plants interfering with
267 the activities of man is strictly interpreted, any plants that are not
causing such interference should not be classed as weeds.

268 The oldest methods of weed control are probably mechanical methods -
273 although the use of fire may also be an ancient method. Basically, the
use of mechanical methods involves the pushing, pulling or rolling of
various shapes and designs of wedge-shaped objects through or over the
areas infested with weeds. A knife on the end of a stick may be a hoe, an
ax, or any one of a number of familiar tools. Much study and ingenuity
have gone into the design of our present self-propelled vehicles equipped
with variations of such tools that have come into almost universal use
during the past 20-30 years and have displaced to a considerable extent the
hand-labor methods of weed control in common use up to a few years ago. At
the present time modern machines for weed control and tillage have reached

a high state of development. Their operation and complete effectiveness is limited, however, by several factors. Some of these factors are weather conditions, soil moisture, and soil characteristics, all of which combine to form a complex that is not helpful toward greater precision or efficiency of operation.

There is another phase of machine or mechanical development in which progress towards greater precision and efficiency is being made. I am referring to the machines for application of chemicals such as fertilizers, herbicides, insecticides and all of the pesticides. Improved machines of today represent advances over those in use a few years ago. Without our present machines which have been carefully designed and utilize the unique properties of some of our modern alloys our weed and other pest control programs would be severely handicapped. It is an interesting, although perhaps idle mental speculation to wonder whether the European observation of more than 50 years ago to the effect that solutions of 2 per cent sulfuric acid could be selectively used against certain broad-leaved weeds in small grains might not have had a greater effect upon our agricultural practices if modern, corrosion-proof alloys had been as abundant and relatively cheap as at the present time.

Without doubt the future will see the design and development of new machines for use in weed control and in these changes the agricultural engineer may confidently be expected to play a highly important and essential role.

The biological interrelationships of crops and weeds will now be briefly discussed. Differences between the growth habits of crops and weeds being produced on a given area have long been utilized in weed control. The growing of shade or smother crops, close spacing, crop rotations (including tillage) are examples of biological weed control that have been and will doubtless continue to be important.

Up until a few years ago the combination of biological knowledge of crops and weeds and mechanical operations was almost the only known method of weed control. Under good conditions quite effective weed control in many of our crops can be achieved. The availability of chemicals for weed control in recent years has in no way diminished the importance of basic knowledge of the biology of our crops and weed species.

Although many of our important crops have been studied intensively for years and a wealth of information has been accumulated on their mineral, water, temperature and soil requirements, there are wide gaps in our knowledge of most of our important weeds. This is not at all surprising because such plants at best are usually of negative economic value. In addition, at least until the introduction of chemical methods of control, there was little practical use that could be made of such information because control was more or less limited by the development and perfection of machinery.

Present-day workers in weed control frequently need information on the physiology of weed species, the longevity of seeds in the soil, temperature, water, and soil relations necessary for germination of weed seeds and on insects and pathogenic organisms attacking certain species. Such information is usually plentiful insofar as our crops are concerned, but is relatively scanty on most of our important weed species.

Time limitations prevent more than the above superficial review of the biological aspects of weed control. Obviously, a wide, fertile field for biological research is open and awaiting study.

In the remaining time I wish to consider briefly the modern chemical aspects of weed control. If the desired degree of weed control is represented by the formula MBC it follows that an increase in the value of C will necessitate a decrease in the mechanical and biological aspects of weed control. A few of the successful and less successful highlights of weed control with chemicals or herbicides will be briefly discussed.

Chemicals, in a limited way, have long been used in weed control. A little more than 10 years ago, 2,4-D became generally available and its successful use as well as the rapidly acquired knowledge of its limitations served as a stimulant to further synthesis, and evaluation of a relatively large number of compounds. Many hundreds of compounds have been screened for possible herbicidal properties during the past ten years and at the present time a few dozen have found acceptance for specific purposes, and are becoming increasingly important in reducing the costs of production in some of our major crops. In small grains, for example, it has been found practical to obtain a degree of weed control superior to any obtained with the older and conventional methods. In other crops herbicides are used for weed control for a short period of time, during which the crop is expected to grow and develop to the stage where conventional methods can be expected to complete the job.

It should be emphasized that the availability of a potent herbicide does not automatically guarantee weed control. After the availability of 2,4-D, the skills of engineers were needed to design, build and improve machines that could do a good job of application. Our best machines of today represent great improvement over those of 10 years ago. The most effective time of application of herbicides, in many cases involves more or less knowledge of some of the basic theories of physiology of the crop plant. In addition, the principal species of weeds infesting the crop should be known. Such weed identification in turn, calls into play the special skills of the taxonomic botanist.

The principal reason for the necessity of correct identification of weed species is the well-known specificity of herbicides. This specificity may be illustrated by several examples. As a pre-emergence herbicide, CIPC is very effective against crab grass. In fields infested with ragweed, CIPC will suppress crabgrass and certain other weeds but will not appreciably suppress ragweed which will germinate and grow vigorously and become a dominant weed. In small grains 2,4-D will control thistles, vetches, mustards and many other weed species but is almost without value against an occasional field in which galium aparine (a bedstraw) is the dominant weed and which is semi-resistant to 2,4-D. These examples of herbicide specificity could be extended but these two examples will bring out the importance of correct identification of the species for which control is desired.

The present state of knowledge of the science of chemical weed control is at a level where some problems can be solved in a most satisfactory manner.

Other difficult and complex problems await solution. Some suggestions as to how increased effectiveness of chemical weed control can be attained will now be made.

The one common denominator of the progress that has been made, whether in industry or in individual operations appears to be in the application of research results. Research is carried out in industry and in our institutions of learning. Seldom do outstanding improvements in methods or new practical developments occur without a great deal of preliminary intensive study and experimentation that adds to the total sum of information available in a field of knowledge. In the field of growth regulators at least 20 years of work by a considerable number of individuals preceded the introduction of 2,4-D.

It has been aptly said that the greatest discovery of man has been that systematic research can be used to solve difficult and complex problems, and a tremendous volume of research in industry and in our academic institutions has been done and is in progress.

Basically, among other duties the land-grant colleges and universities have the responsibility of training students and workers in the various fields of research. They are, therefore, particularly qualified to conduct research in which the immediately practical or economic value of the research is incidental to the training in techniques and methods received by those doing the work. Research in plant physiology and all the allied fields of botanical science is particularly adapted to their teaching and research programs.

Industrial research programs, on the other hand, are particularly well adapted for the solution of immediately important practical problems. In actual practice industrial research frequently contributes its full quota of basic knowledge to supplement the results obtained in academic research.

The lifeblood of research, whether in industry or in academic institutions, are appropriations of money sufficient to conduct the research and to furnish reasonably attractive subsistence to those individuals conducting the research. Some financial comparisons will now be made between research budgets of several unnamed industrial companies. The figures have been gleaned from various sources but are believed to be approximately accurate.

A large company with sales of around 1900 million dollars annually spends about 3.4 per cent of its sales dollar on its research programs or approximately 65 million dollars. Another chemical company, interested chiefly in "heavy" chemicals, with sales of 500 millions annually budgets 3 per cent of its sales dollars for research, or 18 millions of dollars. A relatively small, conservative company whose basic products are used by other industries almost exclusively, nevertheless, budgets 2 per cent of sales for research. In contrast, we have research budgets in some of the companies servicing the fast-developing field of pharmaceuticals as high as 5 per cent of sales. Obviously, administration and stockholders are in mutual agreement that research programs are both necessary and profitable.

The research budgets of our institutional research centers, whether tax-supported or not, do not often compare favorably on a percentage basis,

although the sums appropriated are large. In some instances total research appropriations do not represent 2 per cent of the market value of a single major crop of a particular area. Obviously, there is not the same agreement on the merits of research between administration and stockholders, the latter being represented by the citizens who each own 1 share of stock. It is to be hoped that in time more support of the type of research for which academic institutions are especially qualified will be forthcoming to supplement the rapid pace set by industrial research.

In addition to financial support for research it is also most important that results of research be available to workers in a given field of science. Opinions on the most effective manner of accomplishing this objective may vary, but unless past research results are indexed in libraries or reference books, the present and future worker in weed control, and in other fields of science is necessarily limited in his comprehension of the field to that portion of the field with which he is personally familiar. In this matter, our own group of workers in weed control are in a position to help promote greater availability of research results.

In conclusion, it can be said that weed control, regardless of which methods are employed is one of the highly important parts of agricultural production and that future advances will be contingent upon ample basic research. It should also not be forgotten that in the next 20 years or so our population can confidently be expected to increase 25 per cent to 200 million people. It is assumed, of course, that we will not be partially exterminated in a war. Along with this increase in population there is a small but steady percentage reduction in our arable land because of increased housing, streets, highways, parks and such recreational areas as artificial lakes. This reduction in arable land is related to the increase in urban population, which is in turn quite dependent upon ample water supplies which occur chiefly in the more humid areas. The increase in population, if current food consumption habits should continue, is certain to greatly increase emphasis upon crop production. It is equally certain that our problems in pest control, whether in weeds, insects, plant diseases or other pests will call for the full exercise of our imagination, ingenuity and research abilities if our present standard of living is to be maintained or increased.

Minutes of the Business Meeting
Southern Weed Conference

Bon Air Hotel, Augusta, Georgia
January 24, 1957

Dr. W. B. Albert, President of the Southern Weed Conference, called the meeting to order at 11:00 A.M.

At the request of President Albert, E. C. Rodgers, the outgoing treasurer, presented the following financial statement to the conference.

ASSETS:

Cash carried forward from 1956	\$ 964.66
Total receipts, 1956 Conference	675.00
Cash from sale of Proceedings after 1956 Conference	705.50
Sustaining memberships	1,025.00
Total	<hr/> \$3,370.16

EXPENDITURES:

Expenses at 1956 Conference	\$ 51.94
Production of Proceedings of 1956 Conference	1,100.07
Postage	104.00
Bank Service Charges	1.67
Printing and mimeographing services and supplies	16.17
Terminology Committee Expenses	10.00
Delegate Expenses to W.S.A. Executive Committee Meeting, Chicago	78.19
Program Committee Expenses	189.26
Registration Badges	36.26
Research Committee Report	227.65
Total	<hr/> 1,815.21
Total Cash on hand	1,554.95
Total	<hr/> \$3,370.16

Respectfully submitted,

/s/ E. G. Rodgers
E. G. Rodgers
Secretary-Treasurer

APPROVED:

Auditing Committee:
/s/ Jack T. Thompson, Chm.
/s/ R. F. Richards

Mr. Thompson moved and Dr. Leasure seconded that the conference approve the financial statement. Motion passed.

President Albert reported on the Weed Society of America Executive Committee meeting which was held in Chicago, January 11-12, 1957. He also announced that the Southern Weed Conference would hold a joint meeting with the Weed Society of America in Memphis, Tennessee, January 13, 14, 15, 1958. A Southern Weed Conference business and research meeting will be held on January 15 P.M., 1958 to conduct business relating to this conference.

President Albert reported that the Executive Committee had selected Shreveport, Louisiana for its 1959 meeting. The meeting will be held on January 21, 22 and 23, 1959 with the Captain Shreve and Washington Youree Hotels serving as joint headquarters.

Upon the request of the President, Mr. Lett presented the following report on public relations.

Four news releases giving pertinent information about the Tenth Annual Southern Weed Conference were prepared and distributed prior to the meeting. Copies of the releases were sent to the following groups:

- (1) Major farm publications
- (2) Selected daily newspapers
- (3) Information specialists (Southern states land-grant colleges)
- (4) Selected radio and TV farm directors
- (5) Officers National and Regional Weed Conferences

Excellent cooperation was received from all of the above named groups in publicizing the conference. If the release was not reproduced, all major publications listed the conference in their space reserved for announcing meetings.

Invitations to attend the conference were sent to the following groups by the Committee: Editors of the major farm publications; selected farm radio and TV directors; directors of information in Southern land-grant colleges.

Two releases were prepared during the conference and distributed to local newspapers, wire services and radio stations. After the conference copies of these two releases were mailed to all farm publications requesting this material.

Since the Southern Weed Conference is meeting jointly with the Weed Society of America in Memphis next year (1958) it is strongly recommended that the publicity of the two groups be closely coordinated. By working together better coverage would be obtained and duplication would be avoided.

President Albert called on Mr. Stamper for the Legislature Committee report. Mr. Stamper reported that there had been no basic changes in the various herbicide laws during the year.

President Albert requested that the report of the Terminology Committee be presented by the Committee Chairman, Behrens. Dr. Behrens report was as follows:

At the 1956 meeting, members of the SWC voted to follow the Terminology recommendations listed in the Weed Society of America Terminology Report (Weeds 4: 278-84. 1956). The WSA terminology report was to be included in the SWC Proceedings if available by the time the Proceedings were published. However, the WSA report was not available by publication time. Therefore, a reprint of the WSA Terminology Committee Report was sent to each person who registered at the 1956 conference when they became available.

Again this year, the Terminology Committee of the SWC would like to urge the members to make use of WSA approved terminology, designations and common names. There are many instances, even in the 1957 Research Committee Report, where the correct designation or common name for a herbicide has not been used.

Since the WSA Terminology Report was published in July, 1956 several additions and revisions have been made. A revised WSA Terminology Report will be published in Weeds in the near future.

There are several points in regard to terminology that the SWC Terminology Committee would like to stress.

1. Names of herbicides should be specific. (Example isopropyl ester of 2,4-D rather than 2,4-D ester).
2. In regard to plant nomenclature, the scientific name should be included in addition to the common name in all publications. This will be helpful to people in other areas of the United States or other countries where a different common name for the plant may exist.
3. The committee would like to suggest the use of a standardized system for evaluation ratings. A 0 to 10 rating basis with 0 indicating no effect and 10 complete kill is recommended for evaluation of effects on both crop plants and weeds.

The SWC Terminology Committee would like to encourage interested people to submit designations for new chemicals to the WSA Terminology Committee early in the development of the compound, if possible. Much confusion can be eliminated by prompt selection of a designation before several have been established by common use.

Upon the request of President Albert, Mr. Westmoreland, Chairman of the Extension Participation Committee submitted the following report.

The Extension Participation Committee, originated in 1955 by the President, Glenn C. Klingman, was continued in 1956 with the permission of newly-elected President W. B. Albert. Its function continued to be the encouragement of participation by members of the various state Extension Service staffs in the programs of the Southern Weed Conference. The Committee continued to encourage the participation of all personnel in the educational field to contribute to and receive the benefits of the Conference.

The major activity of this Committee was that of contacting the Cooperative Agricultural Extension Service Directors of the various states considered within the area of the Southern Weed Conference. The first contact was made through a brief but thorough letter announcing the 1957 meeting. The Program Chairman was requested to send copies of the program to these people. Emphasis was placed on the part such a Conference could play in keeping specialists abreast of weed control information and the need for all possible labor-saving, dollar-saving information reaching production use rapidly.

According to replies received from State Directors of Extension Service, the following points were responsible for the present situation:

- (1) failure to appreciate the need for trained personnel to handle Extension weed work;
- (2) lack of sufficient funds to allow participation;
- (3) no designation of responsibility along lines of specialization;
- (4) lack of available personnel once a position is established.

Apparently most State Extension Specialists Staffs are organized along commodity lines, and these individual commodity specialists are expected to participate in all facets of production. At the present time, even they have a lack of understanding of the need for an aggressive weed control program.

In personal contacts with Agronomy Specialists in the Southeastern states, there is an indication of a failure to understand and appreciate the weed control research program in their individual states. It is the suggestion of this Committee that the individual state research personnel make a point of becoming better known to the Extension personnel and of making known to this group their works.

Intense activities to increase participation of Extension Service personnel in this Conference are strongly suggested. The ultimate goal should continue to be at least one properly trained Extension Specialist for weed control in each participating state in the Southern weed Conference.

President Albert requested that Dr. Porter, Chairman of the Resolutions Committee present any necessary resolution. Dr. Porter

presented a resolution of thanks to the Bon Air Hotel and a resolution of sympathy to the family of Mr. E. F. Cottier. Porter moved the resolution be accepted. Seconded by Klingman. Motion carried.

Dr. Porter also presented the following resolution. The Executive Committee of the Southern Weed Conference recommends that the conference approve the purchase of satisfactory dictating machine and transcriber. The machine will remain in the custody of the duly elected Secretary-Treasurer of the conference. Move that resolution be adopted made by Dr. Porter. Seconded by Dr. Klingman. Motion passed.

Upon request of President Albert, Dr. Leasure, Chairman of the Program Committee thanked the conference for their participation. Dr. Leasure moved and Mr. Mann seconded a motion that the President appoint a committee to determine the length of future meetings and the number of sections that should be included in future meetings. Motion passed.

President Albert requested that Dr. Porter, Chairman of the Editorial Policy Committee, present the committee report. The following report was submitted:

It appears that one of the major obstacles facing weed workers as well as the entire field of weed control is the policy of publication of research (or lack of publication). The journal Weeds, which is the official publication organ of Weed Society of America, is at the present time being distributed to about 1300 individuals or organizations. However, there are not enough manuscripts being sent to the editor for him to fill the pages of each issue. There are several reasons why this might be true and the following three are probably worth considering. (1) A number of people are interested in weed control but only a few are doing any work in this field. (2) A number of people are working in the field but do not value their work enough to publish it. (3) Most of the weed research information is being placed in the weed conference proceedings. While the merits of the former two points are probably debatable, the latter point appears to be of maximum concern. Much valuable information is being, for most purposes, lost by publication in weed conference proceedings. A recent survey has shown that the various weed conference proceedings are not being distributed to libraries in the U. S. to maximum advantage and are available in only a few foreign ones. Another problem is that the "library life" of mimeographed material is rather short. Thus, for both of the above reasons, the valuable research materials published in weed conference proceedings will be in a very short time lost to future researchers. Another aspect of this problem is that many state and federal organizations do not recognize weed conference proceedings as scientific contributions. Thus, in some cases, persons are denied promotions on the basis of not publishing scientific information. It should also be remembered that most journals will not publish an article if it has already been included in full in a weed conference proceeding. It is therefore recommended that careful consideration be given to each research paper by its author and whenever possible, the paper be published in full text in Weeds. Of course, an abstract of the paper can be included in the conference proceedings and the paper presented to the conference.

The committee has considered the following questions relating to SWC proceedings and makes these recommendations to the conference:

(1) Editing of papers.

Each author should carefully edit his paper and also have several of his co-workers edit it. This would, of course, be voluntary but it would no doubt improve the quality of the proceedings.

(2) Type of papers to be included in proceedings.

The conference proceedings should be for preliminary reports. The results of advanced studies should be published in Weeds.

(3) Terminology.

The terminology report of WSA should be followed (Weeds, Vol. IV, No. 3, July 1956).

(4) Type of printing.

If the conference proceedings are to include preliminary information, the present type of printing appears adequate. The present charge for proceedings would not cover costs involved in more expensive type of printing.

(5) Reproduction of conference publications.

(a) Organizations or institutions should not be permitted to reproduce in whole or part the report of the research committee of the conference without approval of the Executive Committee.

(b) Permission to reproduce data from papers in any Proceedings of the Southern Weed Conference should be secured from the respective author(s).

Dr. Chappell moved that report be accepted. Seconded by Dr. Rodgers. Motion passed.

President Albert thanked the conference for their cooperation during the past year.

Upon request of the President, Dr. Searcy of the Nominating Committee presented the recommendations of the nominating committee.

President	E. G. Rodgers
Vice-President	Richard Behrens
Executive Board Members at Large	J. T. Holstun D. C. Drake R. F. Richards

Mr. Searcy also explained that the Secretary-Treasurer had been elected at a previous meeting. Mr. Searcy moved and Mr. Mann seconded that the report of the Nominations Committee be accepted. Motion passed. There being no further nominations, the above officers were automatically elected.

President Albert turned the meeting over to incoming President Rodgers. President Rodgers asked all members for their cooperation in making the joint WSA-SWC meeting a success.

There being no further business, President Rodgers adjourned the meeting at 12:15 P.M.

Respectively submitted,

Walter K. Porter, Jr.
Secretary-Treasurer

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RESOLUTION OF SYMPATHY

WHEREAS, death has taken during the past year Mr. E. F. Cottier, an esteemed member of the Southern Weed Conference, whose contributions to the various phases of weed control will make his absence felt for time to come;

NOW, THEREFORE, BE IT RESOLVED, that this expression of great sorrow over his loss and of sympathy to his immediate family be included in the records of this conference and a copy sent to the nearest surviving member of his family.