

Harry M. Ellwell

Proceedings

NINTH ANNUAL MEETING

of the

SOUTHERN WEED CONFERENCE

JANUARY 16, 17, 18, 1956

NEW ORLEANS, LOUISIANA

P R E F A C E

These Proceedings of the Ninth Annual Meeting of the Southern Weed Conference held January 16, 17, 18, 1956 in New Orleans, Louisiana include formal papers, 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, and 1955 also are available at \$2.00 per copy per year except \$3.50 for 1955.

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THE OBSTINATE WEED

Glenn C. Klingman
N. C. State College, Raleigh, North Carolina

Weed workers, like others, should occasionally pause to consider how far they have come, just where they are, and where they are going. Also, we need to consider just how "obstinate" is this group of plants we call weeds, what are our successes, and what are our failures. Ten years after 2,4-D made its real debut in agriculture and the same year that a "National Weed Society of America" has been organized seems to be a suitable time for such a pause.

From three full time weed workers in the United States in 1934 we have grown to a force of real size when we consider the combined personnel of industry and government. I know of no other phase of agricultural work that has grown so rapidly. Nor has it given any sign of reaching a plateau.

The North Carolina Extension weed control effort is just now snow-balling into an almost formidable program. Counties that were completely indifferent to weed control work just a few years ago would like to have repeated visits by the extension specialist. The specialist finds that as they become familiar with one practice they are eager for and need more help -- not less. You solve one problem only to awaken interest in others. You control cocklebur in corn, only to raise interest in weed control in cotton, soybeans, or peanuts. You control a patch of Bermuda grass only to find need in controlling Johnson grass or nutsedge. Or, they have an aquatic problem. The problems are not necessarily closely related. For example, where 2,4-D has become important there is usually increased use of sodium chlorate. One good job serves to stimulate interest in other work.

Lets go back and see where this all started.

Darwin noted the effect of light in producing certain plant growth movements. He was not able to give any real reason or explanation to the movement. Fitting, while visiting the Dutch East Indies in about 1909 studied the effect of pollen on the orchid flower. He noticed that pollination of the orchid flower was shortly followed by swelling of the ovary. This could be caused by dead pollen as well as by live pollen. Both of these phenomena we now know are controlled by growth regulating substances produced within the plant.

It remained, however, for Dr. E. J. Kraus, Head of the Botany Department at the University of Chicago to first see the real horizons of regulating plant growth through chemicals. His vision and understanding transferred to his students and co-workers has pushed us years ahead in the program.

The synthesis of 2,4-D in 1941, its greenhouse trials in 1942, small scale trials on lawns and field crops in 1943, 1944 and 1945 led to fairly extensive farm trials in 1946. Since then most of us are familiar with the story. Last year, better than 10 per cent of our cultivated acreage in the United States was treated with herbicides.

This story is even more remarkable when we consider the development of other Agricultural Sciences. For example, Mendel first published his laws of inheritance in 1866. The papers went unnoticed until about 1900 and it was another 30 years before real interest developed in plant breeding. Their program has seen its greatest growth within the past 10 years, and it is still rapidly expanding.

Radioactivity was discovered in 1896 by the French physicist, Becquerel. The science of radioactivity and atomic energy has enjoyed its principal growth since about 1940. It has found its main application in the agricultural sciences in the past ten years.

Why have these rather long lags occurred? It is my belief that they are largely due to a lack of adequately trained persons to push out the horizons of the new field. The need for well trained personnel is our greatest deterrent, at this moment, toward moving ahead in weed control work at an even more rapid pace.

Few fully understand the complexity of the problems before us. At this time, I know of no other Agricultural program with as many variables and challenges. Understanding and training is needed that takes years to gain.

The weed is defined in many ways. One definition that I particularly like is "A weed is a plant growing where it is desired that some other plant should grow." This definition implies that it is an obstinate thing, growing where it is not wanted, that the plant has promoted itself against our wishes, and that it has been able to crowd out other plants in the area.

To fully understand these relationships we need a thorough understanding of plant ecology, plant physiology, plant anatomy and morphology. We have to consider plant height; leafiness; growth habits; time of the year that the plant grows; length of the plants life; its reproduction by seeds, stolons, rhizomes, tubers, bulbs or bulblets; are the seeds dormant; do the seeds germinate shallow or deep in the soil; and what is the nature of the plants root system. These are only a few of the factors that first come to mind. Up to this point we have not even mentioned chemicals. How are chemicals absorbed and translocated through the plant, how is temperature, humidity and soil moisture involved? How is soil pH, organic matter; nutrients, exchange capacity, microorganism in the soil, soil texture, class and structure of importance? How are enzyme systems involved in our program? How is the chemical compound and its various analogs involved in effectiveness, absorption, movement through the plant, and resistance to chemical breakdown?

I have gone into detail above for two reasons. First, to clearly show that our problem is somewhat formidable, that this weed problem is truly "obstinate." Secondly, to propose that better training is required to speed the development and acceptance of the "science of vegetation control."

Only through better trained research, teaching, extension and sales personnel can we accomplish our goal. This involves not only academic training but an infectious type of salesmanship that gives faith to a program. Responsibility for such training does not lie entirely within academic circles.

I have a letter from a well recognized weed worker from one of the other conferences. He stated, "We need to make known to the chemical industry the availability of trained personnel for work in their herbicide fields. It strikes me that for the most part, industry hires - - - and then promptly sends them around to visit some of us in the weed field, hoping they can acquire a knowledge of weeds and weed control in a few short interviews. I would like to see the industry recognize that there are institutions that train people in the field of weeds and encourage them to utilize this trained personnel in their organizations."

I would like to propose that in attempting to develop our college training programs we consider the following in addition to the usual social and physical sciences.

1. Thorough training in chemistry, particularly in organic and biochemistry.
2. Thorough training in the plant sciences, such as plant physiology, ecology, morphology, cytology, taxonomy and microbiology.
3. Thorough training in crop production and soil management practices, including the control of insect and disease pests.
4. Familiarity with the literature dealing with the principles and practices involved in cultural, competitive, biological and chemical methods of weed control. An understanding of the various herbicides, how to use them, and their limitations must be developed.

If we can follow such a program we will have men to push the work ahead. The horizons will take care of themselves.

Looking back through the Southern Weed Conference Proceedings, I was interested in the printed speeches of former conference Presidents, along with those of invited speakers. I would like to invite you to leaf through the older Proceedings. You will find interesting and helpful reading. Each speaker in his own way stressed the need for more and better research, and better teaching on all levels. If I didn't know them all I would accuse them of having a persecution attitude. It would appear that "for the lack of one can of powder a war was lost."

Again, I want to emphasize that if we have adequately trained personnel - there is no need for concern in looking toward the future. We can repeat the statement made by Dr. E. J. Kraus in 1945 and echoed by Dr. C. J. Willard in 1954, "Gentlemen, you ain't seen nothin' yet."

FUTURE PROSPECTS FOR CHEMICAL WEED CONTROL IN THE SOUTH

M. W. Parker

Agricultural Administrator, Field Crops Research Branch, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Maryland

Introduction

It is a privilege for me to appear on the program of the 9th Annual Meeting of the Southern Weed Conference. Many of you have had the opportunity to attend and participate in the eight conferences that have preceded this one and you have seen the attendance increase from a few to the many that are assembled here today. The attendance figures alone do not tell the whole story of an increasing interest. At the first meeting of this Conference, there were only a few in attendance who could claim that their major responsibility was weed control research. In 1948, at the meeting in Stoneville, many of those in attendance had full time assignments in agronomy, horticulture or botany, and weed control was a secondary responsibility. Today, there are at least 26 federal and state men in the South working full time on weed control research and an additional 12 to 13 are involved in part-time weed research. This healthy growth speaks well for the future, but with it comes responsibilities that must be assumed if we are to take and hold our rightful place as a new scientific discipline in the field of agricultural research and education.

Problems and Potentials for Weed Control

Data reported in Agriculture Statistics for 1954 show that 3,401,000 acres of farm crops and farmland were treated for weed or brush control in 14 Southern States in 1952. This involved an expenditure of 8.7 million dollars. It is of interest to note the extent of herbicidal usage in the various areas of the Southern Region. The Appalachian area, including West Virginia, Kentucky, Tennessee, Virginia, and North Carolina treated 803,000 acres. The Southeastern States of South Carolina, Georgia, Florida, and Alabama treated 271,000 acres. The Delta States of Mississippi, Louisiana, and Arkansas treated 644,000 acres, and Oklahoma and Texas 1,683,000 acres. There are 146,372,000 acres of land in this area available for crops; 30,868,000 acres of this cropland are used only for pastures; 11,274,000 acres are used for soil improvement crops and fallow, and the remaining 194,230,000 acres are used for cropland. These figures indicated that in the Southern Region we are treating for weed or brush control only one out of every 43 acres of the area available for crops. It is evident from these data that there is ample opportunity for expansion of weed control practices in the South. For example, when we look at the acres of cotton that have been treated with herbicides for the past three years, we note that there has been a leveling off and even a slight decline in 1955, and that only 200,000 - 250,000 acres of the 16.5 million have been treated with herbicides.

There are several probable reasons for this situation. One of the most important involves economics, and the ability of the farmer to make capital investment in equipment and materials. Another is the need to have more educational workers who are trained in weed control work to aid farmers in adopting new practices.

Based on the relatively few complete economic studies that have been made, it appears that the proper usage of herbicides to control weeds in cotton can be a sound production practice in most of the humid Southeastern Region. Although the rate of expansion of the usage of herbicides in cotton is associated with a complexity of sociological and economic factors, there is every reason to expect a gradual increase in the future.

While cotton is the important crop of the South, there are large acreages of corn, soybeans, peanuts, rice, other small grains, sugarcane, and vegetable crops. In 1953, approximately 20 million acres were planted to corn; 3.5 million acres to soybeans; and 5.7 million acres for the principal commercial vegetable crops. Although good progress has been made in developing chemical control measures for many of these crops, increased effort is needed to develop safer, more efficient, and more economical weed control practices for these crops.

There has been great progress in the South in the establishment of increased acreages of pastures of all types. Significant changes in the regional distribution of cropland used for pasture have occurred since 1910. The marked decline which characterizes the Corn Belt and the Northern Great Plains is associated mainly with use of more cropland for crops and less for pasture. In the Northeast, reversion to permanent pasture or woodland and transfer to non-agricultural use have resulted in decreases of cropland since 1910. Increases are most notable in the Southeastern and Mississippi Delta States, where land formerly used for cotton is now used for pasture and hay crops. In addition to these conversions, parts of Central Florida and certain other states offer an example of areas in which new pastures are being developed on land recently cleared and drained. These important shifts in land use bring new problems for weed control research. Not only do weeds cause failures in establishing proper pastures, but all too frequently we see the value of good pastures depleted through the invasion of weeds. Weed control should be practiced from the time of establishment of an improved pasture and should be a continuing standard practice.

In the Southern Region there are 206 million acres of pasture and grazing land; 106 million acres are open permanent pastures; 69 million acres are woodland pasture; and 31 million acres of cropland are used for pasture. This area devoted to pasture and grazing land is the second largest in the United States, being surpassed only by the mountain region in the West comprised of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming which has a total of 207 million acres of land in this use.

We know from our studies on native permanent pastures in the North Central Region that weed control will be accompanied by improvement in the forage composition with more desirable species increasing under good management practices. This work has also shown that chemical weed control was superior to mowing in the control of certain perennial weeds. Work on permanent pastures in the South has shown equally good advantages from using herbicides to control both annual and perennial broad-leaf weeds.

Many areas in the South are potentially good grazing lands but erosion problems and weeds limit their conversion to productive pastures. With the development of suitable machinery and techniques for sod seeding, the prospects are good for developing chemical weed control procedures that will help

substantially in making renovation of run down pastures more successful. Expanded research should consider these aspects. Specific weeds such as horsenettle, wild onion and garlic, palmetto, various thistle, and deep rooted vines, and others appear to warrant intensified effort as time and facilities permit.

In areas of the Southern Region, brush has invaded valuable grazing lands. You are all familiar with the work that has been done in this field. Excellent progress has been made. There will be continuing improvement in herbicides and methods of application but even so, present practices have been shown to be feasible and economical in areas where native grass will develop after the brush has been killed.

Another problem of major importance to the South is the control of aquatic weeds in canals, drainage ditches, lakes and farm ponds. This problem has not received adequate continuing attention in the region. The problem has been more critical in the past few years with the opening of new lands and construction of drainage ditches. When ditch bank vegetation is removed and emergent weeds such as water hyacinths are controlled, submersed aquatic weeds of varied types can receive adequate light and they frequently produce luxuriant growth that is more objectionable and damaging than beforehand. Submersed weeds are difficult to control with the best herbicides available and imposed on this task is the requirement of not adding anything to the water that will harm crops, animals, or man. The development of practical controls is a big order and will require concerted research effort before all requirements are met.

Estimates of the costs of water weeds and their control are not generally available. However, the annual direct cost of treating waterweeds in the Central and Southern Florida Flood Control District is reported to be \$70,000. As these districts complete construction of levees, canals, laterals, pumping stations and other structures in future years, aquatic weed control, however costly, will be absolutely necessary to the efficient operation of the entire water control program in Central and Southern Florida. Pressing aquatic weed control problems are also present throughout much of the lower Mississippi drainage system.

According to our reports, there are 2,000 ponds and small lakes in Florida under cooperative management by the Soil Conservation Service and property owners. The North Carolina Agricultural Experiment Station reported that more than 1,300 farm ponds have been constructed during the past three years in one North Carolina county alone. Waterweeds are already causing serious problems in many of the ponds. Similar situations could be cited for other states in this region.

The Future

The future for weed control in the Southern Region is excellent. The climate is conducive to the growth of some kinds of weeds during most of the year and in spite of all our efforts, I am sure that some weeds will continue to grow. The greatest handicap that we face today, in my opinion, is the lack of enough well trained personnel for research work in this specialized field. We have all read recent news releases from the AAAS meetings in Atlanta that

this situation exists in all fields of science and, therefore, one might be inclined to think there is little that can be done to correct the situation until someone does something to make scientific study more attractive to American youth. I would challenge this viewpoint to the extent that I firmly believe that we could attract more of our present agricultural students into weed control research if we made a concerted effort to familiarize them with the potentialities of the field and at the same time made available to them a better and more challenging curriculum that would adequately prepare the undergraduate student for advanced work in weed control.

I am inclined to agree with a recent statement made by Dr. William L. Giles at the 1st Beltwide Cotton Production Conference when he likened weeds to sin. Both have been with us for generations and man has never seen fit to do much about their complete eradication.

As an undergraduate, prospective workers in our field should have required courses in chemistry, botany, physiology, mathematics, specialized courses in mechanical equipment and English and, of course, other subjects required in any well planned course of study. With this background, advanced study could include organic chemistry, physiology, biochemistry, and more specialized subjects according to personal interests. Much too frequently we review the undergraduate records of prospective candidates for weed control research and find them totally lacking in background subjects essential for advanced study.

Progress in weed control methods in the future will result as they have in the past from basic fundamental research. I can well remember when 2,4-dichlorophenoxyacetic acid was a laboratory curiosity. Who would have predicted that the American farmers would have sprayed nearly 14 million acres of small grains and flax with this chemical in 1953. This surely is progress and there will be equal advancements with more research. But, as with every science, there are years of hard, unglamorous laboratory and field work behind each and every advancement.

We should all be pleased that the progressive farmer and planter are so eager for current information, but under these conditions we must be doubly sure that fundamental studies are in progress to provide us with additional information for more applied usage of current herbicides as well as the newer ones.

Farmer acceptance of any new research practice depends upon his being informed, instructed, and assisted in putting the new information into practical usage. We are woefully weak in having sufficient trained personnel in weed work to carry this information to the farmer. More frequently than not, individual farms have weed problems that require some variations in a general recommendation because of the factors that exist on a particular farm at a given time. Accordingly, he needs the advice of an expert in many cases and the decision can best be made on the spot. We need more extension weed specialists and we need them now! At present, this gap is frequently being filled by research men or extension specialists that have their hands full with other responsibilities. The research man should be devoting full time to the job of finding new and better methods for existing problems and exploring new areas where difficulties can be expected. The educational

program in weed control is worthy of at least one full time weed extension specialist in each state. It was gratifying to learn that Virginia has plans for adding a full time weed specialist and I hope other states can see their way clear to take similar steps.

Literature

If we were to suddenly find ourselves with adequate extension service personnel for weed control work, where would these men look for published material to support their training programs. Are we handling our publications on weed control research in a manner to best fit the needs of the college teachers who are or will be responsible for training students in the principles and techniques of modern weed control? We need to examine our publications in all weed conferences from time to time and evaluate whether or not present methods, which were adequate and desirable 10 years ago, are still serving the original purpose.

A recent editorial appeared in SCIENCE that has much food for thought. Its title was "Rushing into Print". There is a tendency these days to rush into print. This is sometimes inspired by the desire for priority, but we all know that there is precious little new information in the ever-increasing volume of literature we try to scan. The author of the editorial suggests that every scientist should examine a manuscript with these three points in mind: (1) Are you sure you have said what you wanted to say, (2) have you said it in a minimum number of words, and (3) is it worth saying at all? These are good points and apply to all science and all authors.

The literature on weed control methods is large and often hard to find. Librarians are hard pressed for stack space and many refuse to give permanent accession numbers to mimeographed material. This is certainly a serious problem because all weed conference reports are mimeographed or processed. There are much valuable data in these conference reports. The research reports keep us informed on current developments. The proceedings give more detail of real value to the individual research worker, but where is the finished paper published. We need to take a good look and see if we are being fair to the generations that will follow in your footsteps. Much too often the research worker in weed control feels that he has completed the job with a brief report in the proceedings each year. Much of this information is worthy of publication in a scientific journal of your choice and I for one strongly urge you as a Conference to develop guiding principles on publication that considers these points. In my opinion, a workable arrangement would be for each Conference to encourage the publication in WEEDS or any other appropriate journal the results of these research studies warranting publication. Abstracts of these papers presented at the Conference could be published in the respective proceedings and we would thereby gain a more permanent record of our research and avoid some duplication.

The above procedure would not minimize the need for leaflets, circulars, situation reports, and bulletins that carry your facts to the ultimate user.

It has been a real pleasure to meet many of you at your home station and I only wish that it had been possible to visit all the research stations. The cooperative spirit that has prevailed among the state, federal, and industrial

personnel of this region should be a real source of pride for each of you. I can assure you that the Weed Investigations Section will exert every effort to continue the fine cooperation that we have had in this region. Individual or group suggestions on how we can do a better job are always appreciated.

The members of this Conference have demonstrated a high degree of leadership in weed control research. I am sure that this will continue and I wish each of you success in your search for better methods and a more complete understanding of our problems.

MINUTES OF THE BUSINESS MEETING

SOUTHERN WEED CONFERENCE

Jung Hotel, New Orleans, Louisiana
January 18, 1956

Dr. G. C. Klingman, President, called the meeting to order at 11:10 A.M. He announced that the Executive Board in formal session January 15 had elected the Bon Aire Hotel, Augusta, Georgia and January 23-25, 1957 as the place and dates of the next meeting of the Southern Weed Conference. He announced also that the Southern Weed Conference would be host to the Weed Society of America at the Hotel Peabody in Memphis, Tennessee, January 13-16, 1958 and that such meeting would be considered the annual meeting of this Conference.

At the request of President Klingman, V. S. Searcy reported for the Nominating Committee and presented names of the following persons as nominees for the respective offices for 1956:

President	W. B. Albert
Vice-President	E. G. Rodgers
Secretary-Treasurer	W. K. Porter, Jr.
Executive Board	W. E. Chappell
Members-at-Large	E. W. Hauser
	J. P. Wilson

Dr. E. O. Burt moved that nominations cease and a unanimous ballot be cast for this slate of officers. Seconded by J. C. Stephens. The nomination of Dr. Porter indicated that he would take office as Secretary-Treasurer at the beginning of the 1957 meeting of the Conference and serve in such capacity for a period of three years. Motion passed.

Upon request of the President, Dr. R. Behrens, Chairman of the Terminology Committee, stated that last year the Southern Weed Conference terminology report was identical with the terminology report of the Weed Society of America. He asked Dr. W. C. Shaw, Chairman of the Weed Society of America Terminology Committee, to comment on the 1956 WSA terminology report. After such comment, Dr. Behrens made a motion that the Weed Society of America terminology report be included in the 1956 Proceedings of the Southern Weed Conference if available in sufficient time; if not, that such report be prepared and sent separately to each Conference member. Motion carried. With the approval of the Southern Weed Conference Terminology Committee, Dr. Behrens then made a motion that all members of the Southern Weed Conference use the herbicide designations listed in the Weed Society of America terminology report when preparing weed control literature. Motion carried.

President Klingman called for the report of Treasurer E. G. Rodgers. The Treasurer's report was accepted by the Conference after its presentation as follows:

FINANCIAL STATEMENT
Southern Weed Conference
January 18, 1956

ASSETS:

Cash carried forward from 1955	\$ 733.65
Total receipts 1955 Conference	880.00
Cash from sale of Proceedings after 1955 Conference	617.10
Sustaining memberships	1,050.00

Total	\$3,280.75
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EXPENDITURES:

Expenses at 1955 Conference	\$ 18.32
Production of Proceedings of 1955 Conference	1,738.97
Postage	167.00
Stenographic assistance (excluding production of Proceedings)	20.25
Telephone calls by Secretary	6.55
Bank Service Charges	2.29
Printing and mimeographing services and supplies	116.27
Program Committee expenses	93.93
Registration badges	21.76
Research report	130.75

	\$2,316.09
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Total cash in bank	964.66
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Total	\$3,280.75
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Respectfully submitted,

E. G. Rodgers
Secretary-Treasurer

APPROVED:

Auditing Committee:
/s/ G. M. Shear
/s/ J. T. Thompson
/s/ J. K. Leasure, Chm.

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