DR. JOHN R. YOUNG – ECONOMIC ENTOMOLOGIST

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ABSTRACT

Dr. John R. Young, USDA-ARS-IBPMRL (retired), developed chemical and autocidal strategies for controlling the fall armyworm, Spodoptera frugiperda (J. E. Smith) in corn and sorghum. Dr. Young’s career spanned 30+ years with USDA during which time he published more than 100 articles in professional and/or popular journals. Dr. Young was one of the founders of the Fall Armyworm Conference, from which 133 recorded presentations and 57 articles by conferees have been published. Dr. Young pioneered principles and methodologies for the safe, economical, and efficient management of economic insect species through “insectigation”—the application of pesticides in irrigation water. John has been one of the discipline’s true “Economic Entomologists.”

RESUMEN

El Dr. John R. Young, jubilado del USDA-ARS-IBPMRL, desarrolló métodos autocidas y químicos para control del cogollero del maíz, Spodoptera frugiperda (J. E. Smith) en maíz y sorgo. La carrera del Dr. Young abarca más de 30 años con el USDA. Durante este tiempo publicó mas de 100 artículos en revistas profesionales y populares. El Dr. Young fue uno de los fundadores de la Conferencia del Cogollero, en la cual se han efectuado 133 presentaciones y se han publicado 57 artículos. El Dr. Young fue un pionero en los principios y metodologías para un manejo seguro, económico y eficiente de las especies de insectos a través de la ‘insectigation’-aplicación de insecticidas en el agua de irrigación. John ha sido un entomólogo económico verdadero.

Dr. John R. Young was born on August 6, 1932 at Perry, FL where he grew up, and remained through high school. John’s interest in entomology began while he served in the Armed Forces in Korea as a medical laboratory technician from 1949 to 1951. After returning from Korea, John began his undergraduate study at the University of Maryland, where he received his B.S. in Bacteriology - Chemistry and Zoology in 1957. He also completed graduate work at the University of Maryland, receiving his M.S. in Entomology in 1959 and a Ph.D degree in Entomology, with a minor in Statistics, in 1964.

Following graduation, he relocated to Tifton, GA where he became a research entomologist with the U.S. Department of Agriculture’s Agricultural Research Service, Grain and Forage Insects Branch, at the Southern Grain Insects Laboratory (SGIRL) (currently Insect Biology and Population Management Research Laboratory [IBPMRL]) under the direction of Dr. H C Cox. During his 30+ year career, Dr. Young served under two additional laboratory directors, Drs. A. N. Sparks and Charlie Rogers.

Dr. Young is married to the former Ilene Carpenter. They have two children, Jim and Malinda, and two grandchildren.

Dr. Young first formulated the idea of a conference on the fall armyworm around 1976. He discussed with several colleagues his concepts of an informal conference followed on alternate years by a formal symposium. The first fall armyworm symposium was held in January, 1977 as an informal conference at the Francis Marion Hotel in Charleston, SC, with Dr. Young as moderator. There were 38 participants discussing topics of: Resistance to Insecticides, Application Methods, Migration, Parasites, Rearing,
Pheromones, Light Traps, Host Plant Resistance, Hosts, and Economic Importance.

The beginning of this important conference occurred before the devastating "outbreak" of fall armyworm in the summer of 1977. The second conference was held in January, 1978 at Gainesville, FL with Dr. E. R. Mitchell as the moderator. There were six presentations. The second conference had its proceedings published in 1979 in the Florida Entomologist. Editors of the Florida Entomologist agreed to publish all subsequent proceedings, which now have abstracts in both English and Spanish.

Since that first meeting of interested participants, there have been seven informal and five formal fall armyworm conferences, which have resulted in a total of 133 recorded presentations and 57 published articles. These impressive records must be at least partially credited to Dr. Young for his vision of developing better management systems for the fall armyworm through the formal exchange of information among interested scientists, producers, and industry representatives.

As a research entomologist at the IBPMRL, Dr. Young's mission was to gain new knowledge on the insect biology/ecology and population dynamics of pest species of field crops (with emphasis on the fall armyworm) and to apply this information toward the development of chemical and autocidal strategies for control. Dr. Young pioneered principles and methodologies for the economical, efficient, and environmentally sound strategies of management of economic insect species.

To date, Dr. Young's research career spans 30+ years, during which time he has authored or co-authored over 100 publications and made over 70 presentations, 27 of which were invitational. The following are but a few of Dr. Young's many accomplishments over the expanse of his career. Dr. Young and coworkers developed the concept of inducing sterility in the fall armyworm with chemosterilants. Chemosterilant feeders were designed, effective chemicals were identified, and criteria were developed for assessing sterility, thus introducing a safe and efficient technology for managing fall armyworm populations with minimum contamination of the environment.

Dr. Young found that adults of fall armyworm could also be sterilized with gamma irradiation. He identified the effective radiation dose and established the most susceptible developmental stage. Dr. Young found that the production of substerility in the F1 fall armyworm with gamma irradiation was a viable approach for inducing sterility in subsequent generations. Because of reduced somatic damage, substerile fall armyworm were more competitive in nature than fully sterile insects and, thus, suppressed the wild population by infusion of deleterious genes.

One of Dr. Young's more important accomplishments was his work on the SGIRL corn earworm colony. He conceived the criteria for colony characterization, established the mating regimes to insure retention of heterozygosity, and conducted the trials that verified the rearing procedures. This colony has been utilized by the entire laboratory staff for achieving reproducible laboratory and field results.

Dr. Young developed a control strategy for fall armyworm that allowed production of multiple crops of field and/or sweet corn in the Southeast. He identified plant growth stages, based on leaf development, where damage by and control of the fall armyworm had the greatest effect on grain and forage yields. John found that the second crop of field corn produced its greatest returns for management cost when it was harvested as silage.

Dr. Young will probably be remembered most for the research conducted during the last ten years of his USDA career. Dr. Young observed the early expansion of irrigation usages in the southeastern U.S. and envisioned with it a means for the safe, economical, and efficient delivery of agricultural chemicals, including pesticides, to their target. John pioneered the introduction of chemigation, the application of agricultural chemicals (i.e., pesticides, fertilizers, and growth regulators) in irrigation water and demonstrated the practicality of this control strategy.
Dr. Young convened a group of interested scientists in Atlanta in 1982 that became the "Chemigation Information Exchange Group." This group has met annually to exchange information on chemigation, insectigation, and fertigation. He has since taken a lead role in the founding and promotion of this innovative technology, including helping to organize and serving as editor on "National Symposia on Chemigation" in 1981 and 1982.

Dr. Young successfully integrated irrigation and insect control into a cost-effective approach for grain production. Early studies with emulsifiable formulations of insecticides revealed that they were diluted to ineffective levels when applied in irrigation water. Subsequent efforts by Dr. Young revealed that insecticides formulated in oils (without emulsifiers) would remain intact during transport in irrigation water, but would penetrate the plant canopy, and separate from the water phase when it impinged upon the plant or insect surfaces. In studies involving the use of specific insecticides in non-emulsifiable petroleum or seed oils, control of corn earworm and fall armyworm was equal or superior to that achieved with conventional methodology.

As we conclude this dedicatory address on Dr. John R. Young, what more befitting things could be said than those of his peers, as follows:

"Dr. Young was able to put together a truly multidisciplined program aimed squarely at the limiting factor for corn production in the area, the fall armyworm Spodoptera frugiperda (J. E. Smith). It was in this regard that we at Dow first came to work with John and I emphasize work. He is a hard man to keep up with. John needed a material with excellent fall armyworm activity and low solubility. Our LORSBAN* product turned out to be well suited to John's uses. Unfortunately our emulsifiable formulation was not. Thus began a series of studies on various adjuvants and formulations designed to optimize the activity of the material. That activity continues to this day; and through it all, John's ideas have figured prominently in our development and labeling process. In the last few years John has carried word of this new application technique throughout the country. As an ambassador for chemigation, he has organized symposia, spoken at a multitude of crop clinics, and been a tireless inspiration to those trying the method for the first time. The fact that in 1983 chemigation in corn jumped from less than 1% to around 10% of the foliar market is a tribute to the fit of the method. John has acted as a catalyst, especially when he speaks to consultant organizations and irrigation workshops throughout the country. He gets people excited by talking about the basic benefits of the method. John most definitely is an independent thinker. He has pressured us for years to develop a non-emulsified LORSBAN formulation for chemigation. Finally, in 1984 we had one for him to test."(L. L. Larson, Agric. Products Dept., DOW Chemical USA, Midland, MI).

"I credit Dr. Young's efforts as being the single most important factor in establishing the credibility, practicality and validity of chemigation as an economically effective technique for the control of insects, particularly with respect to corn. At a time a few years ago when practically all scientists discounted chemigation as a practical means of applying pesticides whose efficacy depended upon their remaining on the plant foliage, Dr. Young maintained that the technique did have promise. He intensified his research efforts on chemigation, working diligently on basic studies of chemical formulations for chemigation, application techniques and the resulting efficacy in field studies. His diligence in pursuing this research with industry, other scientists and farmer cooperators was, in my opinion, the
driving force which elevated the application of insecticides via chemigation to the current level of acceptance. As you know, chemigation is now receiving widespread interest in not only the scientific community but also in industry and by farmers. Dr. Young's role in establishing this technology is manifested not only by his publications but also by the numerous requests which he receives for presentations to regional, national and international scientific meetings, industry and grower groups." (E. Dale Threadgill; Prof. and Head, Agric. Engineering Dept., University of GA, Athens, GA).

"During the past several years, Dr. Young, using imaginative and innovative research approaches, persuasion, and perseverance has become a nationally and internationally recognized authority on applying chemicals—specifically insecticides—through irrigation systems (chemigation). This research has developed new parameters on effectiveness of selected insecticides in relationship to formulations, carriers, deposition on target organisms, potential dilution effects, and safety during application with irrigation systems. Dr. Young's research on chemigation has proven that this technique is a viable and economically sound procedure that can be used in irrigated agriculture. His research has made late season crops of field corn and sweet corn feasible by effectively controlling insects with timely application of insecticides through irrigation. This application technology has a significant economic advantage over conventional application methods and can be used in a timely, effective, integrated pest management program." (Clyde C. Dowler, Res. Agronomist, USDA-ARS, Tifton, GA).

"As a practitioner of IPM in the cropping systems of the central great plains, where irrigation is a way of life, I know of no single research worker who has contributed so widely to a practical approach to controlling many insect pests of corn, milo, field beans, potatoes, soybeans and alfalfa. Dr. Young's insectigation research, particularly the addition of oil to insecticide application through sprinkler irrigation, has and is revolutionizing insecticide application to this area. Previous to his work with vegetable additives, insectigation was limited to applications using minimal amounts of water. This was frequently impossible due to the necessity to continue irrigating; the crop water needed. With the added oil, farmers can insectigate with irrigation amounts of water. This does not break the irrigation cycle nor reduce the insecticide's effectiveness." (Earle S. Raun, Ph.D. R.P.E., Pest Management Co., Lincoln, NE).

"Dr. Young has been the leader of several multidiscipline research teams involved in applying insecticides through overhead sprinkler irrigation systems for controlling insects on many crops. This innovative means of applying pesticides resulted in three National Symposia on Chemigation held at the Rural Development Center, Tifton, GA in 1981, 1982, and 1985. Dr. Young was a leader in planning and organizing the symposia. The new technology generated by Dr. Young has resulted in label amendments for two major insecticides for broader use on many crops. In addition, he has been active in transferring technology from his research program to various user groups. For example, with fewer insecticide applications than required with conventional methods, he has consistently demonstrated greater than 99% control of the corn earworm on sweet corn, a high value crop in the United States. Much of Dr. Young's research results in maximizing insect control, minimizing use of insecticides, and reducing unit production costs." (A. W. Johnson, Supervisory Res. Plant Pathologist, USDA-ARS, Tifton, GA).
“My association with John relates to his pioneering research injecting insecticides through overhead center pivot irrigation systems. Insectigation is a rapidly advancing new technology of pest control and is a process that is being accepted by a growing number of producers of irrigated crops. John’s foresight in developing the research program on insectigation and his involvement in disseminating his research information through public meetings and other media has put him in a position of being a national leader in economic entomology.” (John F. Witkowski, Ext. Entomol., University of Nebraska, Lincoln, NE).

“I have had the distinct pleasure of working with John for a number of years, both in small plot testing, lab trials and, of course, chemigation. I found John to be a very innovative, enthusiastic, dedicated and seemingly tireless researcher. John’s work on fall armyworm, on corn, his work with R. R. Chalfant on vegetable insects, his work with A. W. Johnson on nematicides, and his numerous other consultations with researchers and growers have, I feel, played a major role in the development of insectigation as a viable, practical approach to insect control that offers the grower a number of advantages over conventional methods including ease of application, more uniform coverage, lower application costs, etc. I feel his discovery that activity of foliar insecticides was significantly enhanced by the addition of vegetable oil was the most important. This discovery allows the use of lower rates of insecticides which is beneficial to the grower, the consumer and the environment. As a result of his discovery and subsequent work to explain this phenomenon, I believe it will only be a short time before there will be a significant number of foliar insecticides, herbicides and fungicides formulated specifically as oil formulations for use in chemigation systems.” (William S. Hurt, Project Manager, Agric. Prod. Res., Rohm and Haas Co., Spring House, PA).

“From having worked with John for the past several years, I know of no other entomologist more deserving of this recognition than Dr. Young. John has always shown outstanding enthusiasm and dedication to the field of chemigation for pest management. I and my colleagues consider Dr. John Young to be the outstanding researcher and pioneer in this field of research.” (J. C. La Prade, Field Development Representative, Rhone-Poulenc Ag. Products Co., Dothan, AL).

“Dr. Young has not worked in isolation and through his enthusiasm has attracted researchers in other agricultural fields to study crop production holistically. John was instrumental in the direction and success of the R. K. Mellon Foundation ($2 million) Irrigated Crop Production Project.” (Richard B. Chalfant, Professor, Dept. of Entomology, CPES, Univ. of GA, Tifton, GA).

“John is one of those individuals who refuses to take no for an answer. His concepts and ideas go beyond where others have stopped. John has single-handedly changed the concepts of the farmer and brought chemigation into a new era.” (James M. [Jim] Rice, M. L. Bull Co., Inc., Norcross, GA).

The aforementioned comments by several of John’s peers exemplify his work, his dedication, and many of his accomplishments. Dr. Young has certainly been interdisciplinary in his research. Dr. Young is truly deserving of the recognition by this conference. Therefore, it is a sincere and distinct pleasure for us to have been able to bring this dedicatory address to honor “Dr. John R. Young – Economic Entomologist.”