

Insecticides - What Does the Future Hold?
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Most, if not all, entomologists involved in the development of cotton insect management systems agree that an essential part of a successful Integrated Pest Management (IPM) program is the availability of an efficacious material against a system's key pests. Certainly an appropriate question is this: What are the prospects for maintaining such compounds? First, a little history: During the past three decades the resistance phenomenon has removed from our insecticide arsenal three classes of chemicals for at least one key pest in the major crops system. This is a loss of an efficacious materials at an alarming rate of one class of chemicals for each decade. It presently appears that the more recent group, the synthetic pyrethroids, are facing the same demise.

The agricultural chemicals industry has done an outstanding job of providing the cotton insect control practitioner with an array of highly efficacious products for his insect pest control requirements. In fact, they may have done too good of a job giving us economical, highly effective materials. They have made it easy to treat for an insect problem, thus we have not developed a strong insect management mind set. Presently, in the USA the availability of dependable products is decreasing due to increased labeling requirements, increased manufacturing costs, and an attitude of hostility by the public toward insecticide use for any reason. The long-term impact

of these conditions along with the added threat of resistance development on the chemical industry's attitude for new product development is probably anyone's guess. It's hard to imagine, however, that the outlook will be optimistic. Recently, I visited with a number of colleagues in the chemical industry. If I did not misunderstand them, they indicated that there is no completely new chemistry in the offing and there are no molecules under development that are more efficacious than the present synthetic pyrethroids. Furthermore, with the compounds being developed, the USA is perhaps a short decade away from marketing one of these products.

For the past 38 years I have been involved in cotton insect control from three different positions: As a consultant, a producer, and a research scientist. Presently, the most effective array of insecticides for control of cotton pests is at our disposal. I have seen organo-chlorine resistance develop in the boll weevil, phosphate resistance develop in the tobacco budworm, and it appears that I may be on the brink of seeing synthetic pyrethroid resistance developing in the tobacco budworm. Always before, however, when resistance to a compound was encountered, compounds as effective or even more so were available to replace the ones being lost. This is not the case today. We have little hope of replacing any chemical class compound that we may lose.

This situation is serious, but I see no cause for assuming a

defeated attitude. I am confident that the industry can and will develop procedures that will enable us to continue a profitable enterprise of cotton production.

There are a number of areas that require serious consideration and substantial renovation for the industry to enter into a successful effort of resistance management.

The academic community must accept the fact that the question "how" is just as relevant and important as the question "why". Basic research is vital, but it must not be conducted at the crippling expense of applied research programs. I believe that the current methods of recognizing contributing young scientists are carried out in such a fashion that it reduces interest in field research. Because of the demand for publications (numbers of publications), grants, awards, etc., which are required and/or expected for consideration of promotion and salary increases, there is too little emphasis on the ultimate outcome of the basic research. The producer using the laboratory science must be considered. The incentives we provide to promising young scientists must be of such a nature that cooperative, interdisciplinary programs are encouraged, maybe even required in some instances.

Researchers must begin to provide a technology for increased precision in insect control strategies. Economic treatment levels, increased precision in sampling procedures, and decreased time in

taking an adequate sample are areas that require immediate attention. I consider these areas to be the Achilles heel of insect control programs. Any impact producers can have on policy makers must be directed toward the importance of the funding process.

Producers must regard the presently available insecticides as non-renewable resources. The treatment recommendations must be based on careful, precise field evaluations. Is this procedure too expensive? Consider the costs of losing the synthetic pyrethroids. In the USA, we could double the amount being paid on a per acre basis for "scouting" and still be dollars ahead.

Also of importance is the unification of our industry. It does make a difference what your neighbor does. Farmers in the USA are fiercely independent and the cotton industry has reached its present level of production partly due to this characteristic. But we can no longer enjoy the same degree of luxury when we consider how our present insect control strategies depend heavily upon an effective insecticide and how close we are to losing them.

I would urge you to work more closely with production scientists to develop effective means of "fine tuning" water utilization, fertilizer programs, and variety selection with your production and harvesting capabilities. Expand your control efforts to include as large a geographical area as practical. The larger the area involved, the greater the potential for bringing about a profound

impact on a pest population. The development of economic treatment levels requires that we build into an equation a producer's perception of insect attack and injury, the types of action available to him, and a producer's objectives of pest control including profitability, reliability, convenience, and safety. Thresholds are incredibly dynamic and some consider it an exercise in futility to become involved in the area. It's true we may never determine the exact level, but in the process of our efforts, we can certainly improve upon what we presently are using.

Being sure that an adequate sample has been taken for making a treatment decision is probably the most frustrating component of developing a control program. Variations among individual samplers, the ability to recognize an insect problem, ability to concentrate, and an individual's perception of responsibility produce pheromonal variations in counts reported. We must develop a rapid, accurate method for taking an adequate sample, one that eliminates as much as possible the human error variable. This, in my opinion, should be the highest priority in the research area.

Research that will provide the data for such significant changes will come painfully slow and will be expensive. Much of the research will be applied and this fact will result in funding requests meeting with considerable opposition. Short-term proposals will not suffice, we must have long-term, carefully planned research efforts adequately

funded if we are to provide substantial change in our control strategies.

I would ask producers to consider susceptibility to an insecticide as a non-renewable resource that is to be protected with the tenacity of an English bulldog. We no longer can tolerate the irresponsible action by those who may bring about an untimely loss of such a valuable resource.

Finally, in many cases the insecticide industry compensates their sales personnel based on sales volume. Perhaps consideration should be given to an alternative plan - one that doesn't require volume. Selling quantity seems to be counterproductive to protecting the availability of present compounds.