

The Pesticide Conspiracy

The attempts by the supporters of uncontrolled pesticide use to discredit ecologist Rachel Carson, author of *Silent Spring* (Houghton Mifflin, 1962), in which she warns of the dangers of indiscriminate pesticide use, emphasize the fact that although she was a scientist, her training and expertise were not specifically in the field of pest management. No such claim could be made about Robert van den Bosch, a highly accomplished scientist whose research career was devoted to the problem of controlling pest populations. Although van den Bosch's prose lacks the grace and literary merit that helped to make *Silent Spring* a best-seller, his well-documented book *The Pesticide Conspiracy* (Doubleday, 1978) is an even more potent indictment of the pesticide industry. In particular, he exposes the industry's influence in turning the U.S. Department of Agriculture into a willing accomplice in promoting the irresponsible, ecologically disastrous, and ineffective overuse of chemical poisons.

In the following excerpt from *The Pesticide Conspiracy*, van den Bosch not only details the reasons why chemical poisons alone have not, and cannot, control agricultural pests, but he emphasizes that a much more effective alternative exists. This alternative is integrated pest management (IPM), which relies on a wide variety of technologies (including judicious use of appropriate chemicals), based on detailed knowledge of the pest in question. Van den Bosch was one of the developers and early advocates of IPM. The fact that it has taken more than three decades since *Silent Spring* for government agricultural policymakers to embrace IPM can in some part be attributed to the untimely death of van den Bosch shortly after the publication of *The Pesticide Conspiracy*.

Key Concept: integrated pest management

INTRODUCTION

A Can of Worms

In the early summer of 1976, a popular California radio station broadcast to growers an insecticide advertisement prepared for a major chemical company by a New York ad agency. The broadcast warned the growers of the

imminent appearance of a "menacing" pest in one of their major crops and advised that as soon as the bugs "first appear" in the fields the growers should start a regular spray program, using, of course, the advertised insecticide. The broadcast also claimed that the material was *the one* insecticide the growers in the area could depend on for effective and economical control of the threatening pest, and further told the growers that through its use they would get a cleaner crop and more profit at harvest time.

The advertisement epitomizes what is wrong with the American way of killing bugs, a practice more often concerned with merchandising gimmickry than it is with applied science. In connection with this gimmickry, much of modern chemical pest control is dishonest, irresponsible, and dangerous. This was true of the radio advertisement just described. It was *dishonest* in its claim that the touted insecticide was *the one* material that growers could depend upon, for in actuality there are several equally effective insecticides and none will assure a cleaner crop and more profit. The advertisement was *irresponsible* in advising growers to initiate a regular spray program upon "first appearance" of the pest. Intensive research has shown that spraying of the crop should be undertaken only when the pest population reaches and maintains a prescribed level during the budding season and that sprays should never be applied on a regular schedule. Finally, the advertisement was *dangerous*, because the advised spraying, if widely adopted by the growers, would have resulted in the senseless dumping of huge amounts of a highly hazardous poison into the environment.

As a veteran researcher in insect control, I have long been disturbed by the dishonest, irresponsible, and dangerous nature of our prevailing chemical control strategy, but I am even more distressed by the knowledge that this simplistic strategy cannot possibly contain the versatile, prolific, and adaptable insects. For a third of a century following the emergence of DDT, we have been locked onto this costly and hazardous insect control strategy, which for biological and ecological reasons, never had a chance to succeed.

What is most disturbing of all is our inability to clean up the mess by shifting to the workable, ecologically based, alternative strategy that modern pest-control specialists term *integrated control* (also termed integrated pest management). Integrated control, as the name implies, is a holistic strategy that utilizes technical information, continuous pest-population monitoring, resource (crop) assessment, control-action criteria, materials, and methods, in concert with natural mortality factors, to manage pest populations in a safe, economical, and effective way. Integrated control is the only strategy that will work effectively against the insects, because it systematically utilizes all possible tactics in such a way that they attain full individual impact, function collectively for maximum mutual effect, and cause minimum detriment to the surrounding environment. In other words, unlike the prevailing chemical control strategy, with its emphasis on product merchandising, integrated control is a technology. It is scientific pest control and, as such, the only way we can hope to gain the upper hand in our battle with the insects. In every respect, integrated control makes sense, and it works. Despite this, our swing to this better pest-management strategy has been painfully slow, and for a clear reason. The impediment has been a powerful coalition of individuals, corporations, and agencies that profit from the prevailing chemical control strategy and brook no interference with

the status quo. This power consortium has been unrelenting in its efforts to keep things as they are and as so frequently happens in our society, the games it plays to maintain the status quo are often corruptive, coercive, and sinister.

This book, then, is a tale of a contemporary technology gone sour under the pressures generated by a powerful vested interest. Bugs provide the theme, but politics, deceit, corruption, and treachery are its substance. I feel that the story is a most timely one, for it describes an ecological rip-off and how this atrocity is being perpetuated by tacticians of pure Watergate stripe. The book is largely based on personal experiences and insights gained from more than a quarter century of battling the bugs and their human allies who devised and maintain the inadequate chemical control strategy. It is a tale of personal outrage that I hope proves highly infectious.. . .

INTEGRATED CONTROL— A BETTER WAY TO BATTLE THE BUGS

The 1975 meeting of the Entomological Society of America was the scene of an interesting comparison between the contrasting insect-control strategies of two of the world's great nations, the People's Republic of China and the United States of America. And from what transpired, it appears as though the Chinese pest-control system has more going for it than does ours. I would like to dwell on this matter a bit, for not only does it cast light on the right and wrong ways to combat insects but also because, if we are willing to read the signals honestly, it gives us considerable insight into what is going wrong with the American way of doing things. There may be something of value in such an exercise.

Insect control in China was described, to an audience of two thousand attending the opening plenary session of the Entomological Society, by a panel of America's leading entomologists who earlier in the year had visited China under the China-U.S. cultural exchange. I know most of the panelists, some intimately, and would characterize them largely as politically moderate Middle Americans. In other words, they had no ax to grind on behalf of China and its Marxist political ideology but reported things as they witnessed and recorded them. From what they had to say, it seems that China's entomologists constantly sift the world's literature and other information sources for relevant techniques, methods, and materials, and integrate them along with their own technical developments into a highly effective national integrated pest-management system. Under this system there is continuous monitoring of pest populations, use of action-precipitating pest-population thresholds (economic thresholds), and the implementation of a variety of tactics, including chemical, cultural, and biological controls, as circumstances dictate.

This program is serving China well. For example: using this pest-control system, China grows 39 per cent of the world's rice, which not only feeds her 900 million citizens but enables her to be a major rice exporter. China also utilizes her pest-management system against disease-transmitting and nuisance insects such as mosquitoes and flies. It is interesting that in mosquito control she employs virtually no DDT, apparently relying instead on reduction of

mosquito breeding sources, mosquito exclusion tactics, natural controls, and the judicious use of "safe" insecticides. In this latter connection it is especially noteworthy that China, though producing about one hundred insecticides, relies heavily on seven organophosphates because of their limited hazard to warm-blooded animals. And under her insect-control system, she uses these materials judiciously.

Now let's see how we do things in the U.S.A. Two days after the China report, the Entomological Society heard Assistant Agriculture Secretary Robert Long tell us all about it. On this occasion we were a captive audience, since the convention registration fee included the price of a ticket to the Society's annual awards luncheon, before which industry's spokesman Long performed as "distinguished" guest speaker. In reading the fine print of the meeting program I had earlier discovered that Long's visit to New Orleans was arranged at the behest of the agri-chemical industry. And it didn't take long for him to burst into his expected song as he unleashed a vicious attack on industry's great tormenter, the Environmental Protection Agency [EPA]. In his speech, Long first chortled over the recently enacted, politically inspired amendments to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), which give USDA [the U.S. Department of Agriculture] considerable veto power over EPA pesticide decisions. But then he made it abundantly clear that this was not enough. Despite the FIFRA amendments, Long left little doubt that in his mind EPA still had too much control over the registration and regulation of pesticides, particularly as regards EPA's intentions to seek re-registration of America's fourteen hundred pesticide species and their thirty thousand formulations. Here he ran up the alarm pennant by maintaining that EPA's protocols were so deeply mired in bureaucratic stickum that the agri-chemical industry simply would not make the effort to re-register their materials. In other words, he flatly told us that we were about to lose our thirty thousand pesticides, and he painted a terrifying picture of impending starvation, pestilence, and disease in the wake of this loss.

This rhetoric, as it was intended to do, quite probably frightened the naïve in the crowd while bringing joy to the hearts of Long's chemical-company sponsors. Robert Long, a glib spellbinder, well knew that his prediction of an imminent pesticide wipe-out was complete nonsense. Legal road-blocks and political gamesmanship make this a virtual impossibility. What Long was actually telling us was that the U.S. Department of Agriculture, with powerful political backing, intended to hound EPA into loosening its control over pesticide registration and regulation, to the point where the agri-chemical industry would have things just about as they were in the days before passage of the National Environmental Policy Act. The speech was simply a trial run, with Long using the entomologists to perfect the pitch with which he and other USDA brass planned to bushwhack EPA in forthcoming political jousting.

What he and his sponsors hoped to accomplish, then, was an easing of the way for the American agri-chemical industry to unload its fourteen hundred pesticides in their thirty thousand varieties onto the environment, with USDA bulldozing the path. Fortunately, the 1976 presidential election aborted this plan, which, if it had unfolded, would have permitted the interests of the American chemical industry to transcend environmental quality, public health, and the economic well-being of the farmer and consumer. Madison Avenue

would have predominated, while scientific pest control would have remained a fuzzy dream in the minds of a few radical researchers.

But let's return to China. How can she feed, and protect from pestilence, 900 million people, with just a handful of insecticides, while we are led to believe that we must have thousands of poisons or otherwise be overwhelmed by an insect avalanche? Is it that we have a vastly more severe pest problem? I hardly think so. Malaria is nowhere endemic in the United States, but it is in China, as are other horrible, insect-borne diseases. Nor do we have 900 million mouths to feed. What, indeed, has happened is that China has used her intelligence to invoke a national *integrated pest-management strategy*, while our strategy is chemical control dominated by the marketing thrust of the agri-chemical industry. Result: pest-control chaos, and if we care to look about us, we will find that similar chaos characterizes many of the other things that we do.

But it isn't too late to change our ways in pest control or, for that matter, in other aspects of applied technology. As I have mentioned several times, it was a mistake to challenge the insects head on with crude chemical weapons. The bugs are too diverse, adaptable, and prolific to be beaten by such a simple strategy. But we were so dazzled by DDT's great killing efficiency and, perhaps, our cleverness in concocting the stuff, that we ignored the possibility of a bug backlash and plunged full blast into the chemical "extermination" campaign. And once we had made our move, we were hooked onto an insecticide treadmill just like an addict on junk.

Now, suddenly, in the midst of the nightmare, when our addiction demands heavier doses and more frequent fixes, the chemicals are hard to get and very expensive. Alarmingly, with famine an increasing global concern, many of the chemical eggs in our bug-control basket are no longer effective. The insects, our great rivals for the earthly bounty, are gearing up to march through our gardens, groves, forests, and fields largely immune to our chemical weapons and freed from natural controls. And in the disease area, too, the breakdown is having a disturbing effect, as malaria makes its dreadful resurgence largely because of mosquito resistance to DDT and other insecticides.

The situation would be much more frightening but for a handful of pest-control radicals who never tumbled to the chemical strategy. These are the renegades who quietly worked away on integrated control programs while most in the pest-control arena were on the chemical kick. Though integrated control is still limited in scope, there are enough programs in operation or under development to offer encouragement that there is indeed a better way to battle the bugs.

What Is Integrated Control?

Integrated control is simply rational pest control: the fitting together of information, decision-making criteria, methods, and materials with naturally occurring pest mortality into effective and redeeming pest-management systems.

Under integrated control, natural enemies, cultural practices, resistant crop and livestock varieties, microbial agents, genetic manipulation, messenger

chemicals, and yes, even pesticides become mutually augmentative instead of individually operative or even antagonistic, as is often the case under prevailing practice (e.g., insecticides versus natural enemies). An integrated control program entails six basic elements: (1) man, (2) knowledge/information, (3) monitoring, (4) the setting of action levels, (5) methods, and (6) materials.

Man conceives the program and makes it work. Knowledge and information are used to develop a system and are vital in its day-to-day operation. Monitoring is the continuous assessment of the pest-resource system. Action levels are the pest densities at which control methods are invoked. Methods are the pathways of action taken to manipulate pest populations. Materials are the tools of manipulation.

Sounds like what's going on in China, doesn't it!

Integrated control systems are dynamic, involving continuous information gathering and evaluation, which in turn permit flexibility in decision-making, alteration of the pathways of action, and variation in the agents used. It is the pest-control adviser who gives integrated control its dynamism. By constantly "reading" the situation and invoking tactics and materials as conditions dictate, he acts as a surrogate insecticide, "killing" insects with knowledge and information as well as pesticides, pathogens, parasites, and predators. Integrated control's dynamism is a major factor that sets it off from conventional pest control. Thus, though the latter involves some of the same elements, it lacks dynamism in that it is essentially preprogrammed to the prophylactic or therapeutic use of pesticides. In other words, pesticides dominate the system and constitute its rigid backbone. Where a crop is involved, there is little or no on-going assessment of the crop ecosystem and the dynamic interplay of plant, pests, climate, and natural enemies. This pest-control pattern prevails even in California, our most advanced agro-technology, where over one hundred research entomologists busily at work killing bugs for more than a quarter century have developed fewer than half a dozen valid economic thresholds for the hundreds of pest species. A perusal of the stack of official University of California pest-control recommendations reveals the following kinds of pest-control action criteria:

- when damaging plants
- when present
- when damage occurs
- when they first appear
- when colonies easily found
- when abundant
- when needed
- early season
- when present in large numbers before damage occurs
- anytime when present
- early, mid, and late season
- on small plants as needed
- when present and injuring the plants
- when feeding on the pods
- throughout the season

- when infestation spotty
- when plants are three feet tall.

What this long menu of senseless gobbledygook implies is that in California the insecticide folks have a wide-open field in which to hustle their chemicals, and this they do with greater success than anywhere else in the world.

Under the prevailing chemical control strategy, there is virtually no flexibility in decision-making, particularly as regards alternative pathways of action. The game plan is set at the start and it is stubbornly followed. Result, the familiar case of the fruit grower who year after year automatically sprays his orchard a dozen times or more with the calendar as his main decision-making guide. Or the cotton grower who typically sprays when a chemical-company fieldman drops around and tells him that a few stinkbugs, bollworms, or army worms are showing up in the south forty.

In conventional pest control, one turns on the chemical switch, sits back, and lets the insecticides do the job. It is the lazy man's approach, which characterizes so many aspects of modern life and for which society and the environment pay dearly. A measure of this cost can be gained from a brief analysis of pest control in California.

California's pest control is locked to chemical pesticides. The state is the country's greatest user of these materials, and as stated earlier, receives about 5 per cent of the world's pesticide load. It appears that along with its primacy in smog and earthquakes, California has another distinction: leadership in pesticide pollution. Little wonder! More than fourteen hundred chemical company fieldmen (salesmen) prowl the state, servicing the prevailing pest-control system. They assure a sustained chemical blizzard as well as a fat market for the agri-chemical industry. And at what a cost! Not only does this horde of hustling polluters dump hundreds of tons of unneeded pesticides into the environment, but in the bargain they annually cost California's economy about \$50 million to support their huckstering. The chemical companies and many of the major pesticide users (growers, mosquito abaters, forest pest controllers, and pest-control operators) don't pay the bill, they simply pass it on to the consumer, who doubles as taxpayer. But the story doesn't end with money needlessly spent; there are also ecological and social impacts, which add immensely to the cost of the prevailing chemical control strategy.

What I have just described for California pretty much characterizes pest control for the United States in general, and for that matter, other of the world's modern agri-technologies. Chemical pest control, like so many of our modern practices, is a technology gone wild under the merchandising imperative. And as with our other excesses, this rampant technology must be brought under rein if irreparable damage is to be avoided. I am convinced that we pest-control researchers (particularly entomologists) have the capacity to turn things around through integrated control, and perhaps coincidentally establish a model of technological responsibility for other disciplines.