



## EBDC Fungicides Making (Unwanted) Headlines

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Perhaps you have noticed recent articles about EBDC fungicides. Some have already appeared. Public activist groups are promising that a whole lot more will be said in the near future. I intend with this article to bring you up to speed about the EBDC's, and also ponder the potential effects it could have upon the turf industry.

EBDC's, short for ethylenebisdithiocarbamates, are the most important of all fungicide families. Now you may not have heard of EBDC's per se, but you have heard of Fore, maneb, zineb, Dithane M-45, Tersan LSR, Manzate, and quite a few more. They were developed in the late 1940's. It was predicted then that never would there be a more useful group of compounds discovered for fungicide use. That was proven to be the case, for they have a broad spectrum of activity, very safe on plants, quite economical to produce, and was formerly considered to be extremely safe to man and the environment (LD<sub>50</sub> above 10,000). And no fungal resistance has ever been reported to develop with them.

We've used them some for turf protection, especially for *Helminthosporium*. Fore also carries one of the very few labels for algae control. But they've not enjoyed as much popularity on turf as on other crops, mainly because they're poor against dollar spot disease. They are protective — not systemic or eradivative in activity.

I'm sure you are acquainted with Alar, the now infamous growth regulator used on the apple crop to reduce fruit drop and enhance color. Perhaps you read in a recent Wall Street Journal article about how the Alar furor was orchestrated by a public relations firm involving CBS' 60 Minutes, Meryl Streep and some surreptitious half-truths and rumor spreading that became self-feeding and supporting. That same strategy was set to occur last month for the EBDC's only to be postponed at the last minute for a later release.

If the EBDC's are so safe, you might

ask, then what's the concern about them?

Well, it's an old compound that must be retested and reregistered according to present day requirements. It's very similar to Alar. Long term animal feeding tests show carcinogenic, and possibly some neurologic and teratogenic activity. One of the campus toxicologists the other day suggested the extremely safe acute toxicity level is probably its downfall, that is, it's safe enough to feed high levels long enough to laboratory animals that some problem, real or imagined, can appear. EBDC's are very active both chemically and biologically. One of the reasons they have proven to be so effective is that as the products degrade, the secondary compounds also become good fungicides. Unfortunately, one of these products, called ethylenethiourea (ETU), has shown these chronic toxicity characteristics. And the real confrontation is with the ETU's.

ETU's are transitory. They breakdown readily, they must be ingested to have possible effect, there is no dermal absorption or problems except minor skin irritation, typical of many chemicals, that may affect the occasional sensitive individual. Extensive studies of manufacturing plant workers and applicators have turned up no evidence of problems. Breadbasket surveys report the virtual non-existence of the product on grocery shelves. Toxicologists are clearly divided on the extent of this problem and how to interpret the animal laboratory data. The failure of most of them to get excited about this concern says something to me about its relatively low hazard.

Most toxicologists have come to question the concept of "zero risk" for fungicides (and other pesticides), and instead support a "negligible risk" approach, now followed by the EPA for at least some of its decision-making process. After determining what the threshold is for inducing cancer in laboratory animals, that level is included

in a mathematical model that calculates a "negligible risk" for you and me, e.g., less than one in a million chance that the allowable exposure could cause cancer.

The mathematics at present suggests risks with EBDC's are much higher, at about one in 10,000. But the formula assumes that all crops listed on the label are treated, at maximum rates and as often as legally permitted. Because these products have been around for so long, virtually every known crop is listed. Quite obviously, for anyone familiar with crop production, this is recognized to be a profound exaggeration of actual use.

It also assumes a very low presence of the chemical in our foods. In order to comply with the EPA guidelines, the industry announced in September a voluntary withdrawal of most food and feed crops from the label, so that the mathematics are believed to be acceptable. They also made some other changes, such as extending the period after last application before harvest. The EPA has publicly applauded the changes. Turf and ornamental use, by the way, remain on the label. Though they haven't said this will save the remaining uses, the agency seems to recognize the EBDC's need within a benefit/risk model. The EPA is also calling for a more intensive bread basket survey, with results due sometime next year to support earlier evidence of negligible residues in our food.

But activists are not satisfied with this process. They are condemning the EPA for its sluggishness and calling for an immediate and outright ban.

If they carry out their plans, 60 Minutes will once again parade their scientific charade. (Remember how they vilified Daconil three years ago because of alleged poisoning of a navy golfer? To my knowledge they never did confess their error after a virus was found to be the cause of his unfortunate illness and death.) The next day four simultaneous meetings are scheduled to follow, at which such eminent toxicologists as Meryl Streep (again) and Robert Redford are reportedly expected to lend their voices in calling for the ban.

"Use alternative chemicals," they say. But according to a recent National Research Council report, 90% of all alternative fungicides have similar car-

cinogenic potential! Virtually all of the fungicides introduced more than ten years ago can be faulted in a similar fashion, so it becomes a question of "divide and conquer", e.g., pick on and destroy them, one at a time. In other words, there really is no effective alternative that eliminates the risk as these people apparently would have it.

"So use biological control, resistant varieties and other forms of alternative agriculture." There is indeed some reason for hope and optimism here, but if they really believe this is possible right now, then as the song goes, "I've got some ocean-side property in Arizona" to sell you!

We have been counseled recently that, as educators, it is not our job to persuade people to any one position. We are to present facts, information and alternatives, and allow an enlightened public to make its own choice.

I agree with this philosophy. But it's obvious that many people have no ideas about disease, insect or other pest problems. They apparently fantasize a continuation of unlimited access to the abundant array of cheap, high quality, nutritious fresh fruits and vegetables that we see every day in our grocery stores without the use of some form of chemical protection. And they apparently don't fathom system of pro-

duction, harvest, transportation and presentation of food as a miracle that this country enjoys, much to the envy of most of the rest of the world. It's been too many generations away from agriculture and the struggle to produce food for most of our society to understand this!

I see two big problems in educating the public: 1) they haven't the slightest appreciation for what benefit/risk is all about. "One in a million" talk is too much for them to fathom; and 2) they can't tell when they are being sold a bill of goods. The latter is understandable to some extent with some of the bureaucratic bungling that takes place sometimes. But in the main, isn't it better to trust the toxicologists who have access to **all** the facts, (EPA, FDA, National Academy of Sciences) rather than those who pick and choose according to their hidden agenda?

Golf courses will not operate in a vacuum over this. If the EBDC's fall, other chemicals will follow. Chlorothalonil (Daconil) and captan are already under review. I'm not sure of the current status of PCNB, but I believe it is, too. One strategy reportedly being considered by the EPA is to place a cap on the amount industry can sell of any one product — for all purposes. Chlorothalonil (Daconil) is really the on-

ly alternative for EBDC's in most instances. Can you imagine what could happen to its future availability for golf courses under this proposal?

One news release used the broad brush approach, claiming serious exposures are occurring to the public every day through the wide use of EBDC's on turf. What do they think we're doing — eating the grass!?! It doesn't seem to bother them that there's no evidence — or history — that suggests any problem has ever occurred when applied to grass. Anyway to achieve their goal of a pesticide-free world appears to be their motto.

Interestingly, I have been an advocate for some time of integrated pest management, pesticide applicator training, biological control, research and other approaches that can help to reduce our use and exposures to chemicals. It seems like a goal worth striving for, through a reasoned and orderly process. But experiences with Alar, 2,4-D, EBDC's — and you name it — can harden one's attitude, and force an overly defensive posture for chemicals. Is it possible that backlash may occur one of these times to all the hysteria and hype we're being exposed to? When does phobia become more dangerous than fungicides?

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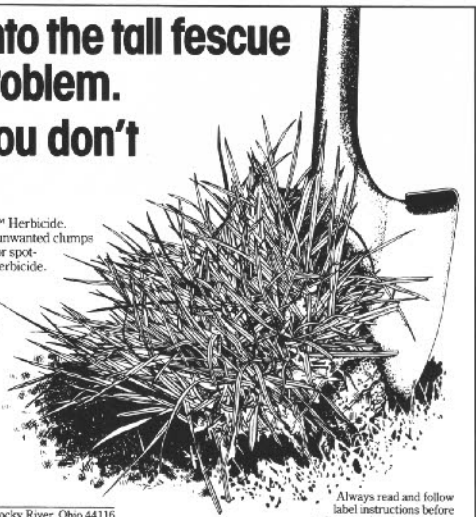
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