

UREAFORM NITROGEN FERTILISERS AND CHLORINATED HYDROCARBONS



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wrote this article for "The
Groundsman", the Journal of
the National Association of
Groundsmen. He describes the
chemistry of these new pro-
ducts and gives timely advice
on their use.

COMING on the market recently have been the new ureaformaldehyde nitrogenous fertilisers, and the chlorinated hydrocarbon insecticides like Chlordane. In the space of this article I will explain chemically what they are and to the best of my researching, what advantages they have for groundsmen.

First the new ureaforms of nitrogen, which are now being advertised very heavily.

Urea is a crystalline compound found in urine. It has the chemical formula $\text{CO}(\text{NH}_2)_2$. This compound can now be produced synthetically. This synthetic urea is combined with formaldehyde (methyl alcohol partially oxidised) to make the ureaforms, or methylene ureas. This type of fertiliser is known as synthetic organic fertiliser, which complicates the old clear cut division of organic and inorganic. Now there appears to be three types which include organic, like hoof and horn: inorganic, like sulphate of ammonia: and synthetic organic, like the new urea formaldehyde.

Synthetic organic fertilisers have been used extensively in North America, but their use in this country, as far as groundsmen are concerned, has been limited. Ureaforms are the net result of a search to combine the power of the inorganics with the less stringent action of the organics. This resulted in a polymerism of formaldehyde with urea, which yielded huge molecules of ureaform that break down very slowly in the soil, and thus the nitrogen content is released very slowly over a longer period of time than would the inorganics retain it. Most of us know of the quick leaching action of inorganics like sulphate of ammonia.

It seems that these new ureaforms—those which are produced for use in turf-culture, will receive favourable attention from groundsmen provided the prices are competitive with the inorganics.



In the United States the latest development in long lasting fertilisers is the coating of the economical inorganic fertilisers with resinous substances that are slow to break down in the soil.

With the advent of Chlordane and its advertising, most groundsmen are curious as to what it is, and what it is capable of achieving as a worm-killer and insecticide. Chemically, Chlordane is one compound in a series of chlorinated hydrocarbon (chlorine: hydrogen: carbon) compounds, that sprung into prominence with the advent of D.D.T., $C_{14}H_6Cl_5$ (14 atoms of carbon: 9 atoms of hydrogen: 5 atoms of chlorine). D.D.T. was invented way back in the 1870's, but was not developed as an insecticide until the second world war.

This was followed by B.H.C. benzene-hexachloride ($C_6H_6Cl_6$). It will be noticed that B.H.C. has one more chlorine atom than D.D.T.

Acquired Resistance?

Chlordane ($C_{10}H_6Cl_6$) was being used as a soil insecticide before 1952, indeed, in North America soil fauna are becoming resistant to it, and have to be eliminated by more potent chlorinated hydrocarbons, or the deadly organo-phosphorus compounds like Malathion and Parathion.

Aldrin (hexachloro-hexahydrodi-methano-naphthalene) and Dieldrin (hexachloro - epoxy - octahydro - dime-thano-naphthalene) are similar in their action as an insecticide, but the chemical composition of Dieldrin has oxygen and more hydrogen atoms in its molecular structure. They are both chlorinated hydrocarbons.

Heptachlor is a real killer and is allowed to be used only as a seed dressing where an attack of wheat bulb fly is expected to destroy the wheat when it is sown. Hepta is Greek for seven, and Chlor is short for chlorine, and all I can find out about Heptachlor is that it is a Chlorinated hydrocarbon with seven atoms of chlorine in its molecular structure.

Toxaphene, the last compound to be discussed, has been in commercial use for many years, and is well-known to most people. I think it is best described as chlorinated camphor.

These "new" chlorinated hydrocarbon wormkillers and insecticides kill through ingestion, that means taking it into the stomach, and by fume vapourisation, thus having more versatility than the older stomach poisons, e.g., Lead Arsenate, or the contact poisons, which can be absorbed through the skin, namely, the nicotine compounds.

Slow-acting.

The effects of Chlordane are usually slow acting, often taking a week, or, as in one case that I know of, a month before the kill is noticed. Apparently the amount of chlorine builds up in sufficient quantities over a period of time in the bodies of the victims before it eventually kills them.

Now here is a word of warning when handling these insecticides, and is the result of a conversation I had with the Ministry of Agriculture, "Don't treat them with impunity." Handle them with great care, especially the concentrates. Read the instructions on the label and follow them, don't be too clever, because they are poisonous, the insecticides, that is. You are also advised to wear rubber gloves and boots and overall.

Summary.

The advantages of this new compound, Chlordane, are:

1. It is a combined worm and insect killer.
2. It is relatively cheaper than Lead Arsenate.
3. Its effects are long lasting, unlike Mowrah Meal.
4. It can be distributed either in liquid form or granular.

If you are thinking of using Chlordane, use your common sense, follow the instructions on the label and you won't go far wrong.