surface water. Subsequent release, occurrence, and persistence of 2,4-DCP were observed. The seeded tap water systems indicated lower levels of the phenol for shorter periods of time than did the natural surface water systems. A field observation substantiated the seeded tap water system.

The following conclusions are made:

1. Commercial formulations of 2,4-D contain 2,4-dichlorophenol as an impurity. Liquid formulations contain more of the phenol than the granular forms.
2. The 2,4-dichlorophenol persists at concentrations high enough to affect odor levels of a natural surface water for at least 218 days as observed in the laboratory.
3. The persistence of 2,4-dichlorophenol in water was decreased to acceptable odor levels within 59 days by addition of a sewage seed as observed in the laboratory.
4. As observed in field and laboratory, threshold taste dilution values were not significantly affected by the 2,4-dichlorophenol impurities in 1 and 3 mg/1 dosages of 2,4-D.
5. As observed in the laboratory, threshold odor dilution values were significantly increased by the 2,4-dichlorophenol impurities in 1 and 3 mg/1 dosages of 2,4-D.

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Effects Of Water Pollution On Aquatic Vegetation

By John W. Wakefield, Director
Division of Water Resources and Conservation
and
William M. Beck, Jr., Biologist
Florida State Board of Health

In the past few years there has been a great increase in aquatic weed control activities in Florida. Involved in this are several state and federal agencies, each with its own particular need. Frequently, one agency in its activities fails to consider the needs or problems of other agencies. It is through such a society as this that mutual understanding can be brought about.

Recent publications dealing with the biological aspects of stream pollution have referred almost exclusively to the animal life in streams. A notable exception is the work of Fjerdingstad (1950). Even this excellent publication is confined to the algae. A survey of the literature covering biological aspects of stream pollution reveals little information regarding the larger aquatic plants.

The following remarks are based on personal experience only. There is no experimental evidence supporting this, with one or two exceptions.

For the sake of this discussion the effects of pollution on aquatic vegetation will be divided into two groups — non-lethal and lethal.

NON-LETHAL EFFECTS

The most significant problem in this category is that of the fertilizing effect of domestic sewage, certain industrial wastes, commercial fertilizers and the like. Here are available not only compounds of nitrogen, phosphorus and potassium but, in the case of domestic sewage and certain industrial wastes, trace elements and growth promoting substances such as vitamin B-12.

The water hyacinth shows the effects of such discharge as does no other higher aquatic plant. Mats of hyacinths in which the individual plants were thirty inches high, with little development of the root system, have been found in areas of enrichment with domestic sewage. When the receiving waters are not covered by mats of floating aquatic vegetation a rich bloom of unicellular algae usually develops. If this effect is produced in a lake there may be extensive kills of fish, production of offensive odors by the algae, an increase in production of blind mosquitoes or any combination of these manifestations.

Less clearly defined effects have been observed with regard to Bermuda-grass, alligator-weed, pickerel-weed, Salvinia and duckweed. The use of biological ponds for the removal of nutrients from domestic sewage and certain industrial wastes is being studied by the Florida State Board of Health at the present time.

Certain other effects which are more difficult to evaluate have been noted. The increased use of synthetic detergents in recent years and the fact that these detergents cannot be broken down by biological methods combine to produce extensive foaming if sufficient agitation occurs in the receiving stream. Where this foam covers growths of hyacinths there is a possibility than an inhibitory action affects plant growth. Frequently hyacinths thus affected are only three or four inches high and generally have a chlorotic appearance.

LETHAL EFFECTS

The most widely known and intentionally used lethal effects on aquatic vegetation are obtained with heavy metal ions, especially salts of copper and arsenic. Many of these heavy metals are toxic enough to kill virtually all plant and animal life in the receiving waters.

Petroleum products in general and heavy oils in particular are especially damaging to floating and emergent vegetation.

Kraft pulp mill effluent with its high hydrogen sulfide content will destroy not only vegetation in the stream but frequently trees along the edge of the stream.

Recently much publicity has been given to the deleterious effects of fluorides in connection with air pollution. Liquid wastes from one processing plant completely sterilized a section of a small river, with the exception of a single species of algae. The first visible effect of the waste in the stream in question was the rapid disappearance of a lush growth of Vallisneria.

Heat as a pollutant has only recently begun to receive the attention it deserves. An excellent study of the cooling water discharge from a generating plant and its effects on the Delaware River is approaching completion and should be available shortly. Preliminary information indicates that Elodea, Potamogeton and blue-green algae will tolerate water temperatures of slightly over 100°F. for at least brief periods.

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Submersed Weed Control With Aqualin* Herbicide

John B. Hussey[1]
Southern Mill Creek Products Company, Inc., Tampa, Florida
July 9, 1962

In June, 1960, Southern Mill Creek Products Company, Inc., became a licensed applicator of the Aqualin herbicide process by Shell Chemical Company. There have been numerous studies and reports on Aqualin herbicide (active ingredient: acrolein) since it was first reported by van Overbeck, et al[2]. We have evaluated the performance of Aqualin herbicide both on an experimental and commercial basis. Our main interest, of course, is in commercial applications.

There are basically two methods of applying Aqualin herbicide (1) flowing water, in which the Aqualin herbicide is added to the water at one or more points and is carried through the canal by the current, and (2) static water such as ponds, lakes and non-flowing canals. In static water, the Aqualin herbicide must be distributed throughout the body of water by moving the equipment.

In Florida, nearly all of our underwater weed control work has been in ponds, lakes and static ditches. We have not treated

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