

PESTICIDE PROGRAM OF THE CALIFORNIA DEPARTMENT OF FISH AND GAME, PART II

JACK LINN

California Department of Fish and Game
Sacramento, California

As mentioned, our project has both fish and wild-life responsibilities. I will briefly discuss our responsibilities in the fisheries pesticide field which are spread over a broad spectrum of programs. We feel all of these programs are essential but because there are so many some do not receive the attention that we feel they should. I think in the past, the investigation in the marine environment is one that should have received a lot more attention than it did.

Among our programs the one that has been given top priority is investigations of fish kills that are caused by pesticides. In this situation our project acts primarily in an advisory capacity to our field force, advising on types of samples to collect, where and when to collect. We handle the analysis and do much of the coordinating with the investigating agencies.

Another major activity is the evaluation of pest control programs. This is done in cooperation with the Department of Agriculture, and sometimes the chemical company. We evaluate the chemicals that are being planned or developed for use and we also evaluate certain application programs that appear to be potential problems. A new program where I feel we have been effective is the case of a new carbamate which is being proposed for the treatment of an insect pest in rice. This chemical is very toxic to fish and in the first studies it was found that five days after it was applied at the rate of one half pound per acre the fish could not survive in the water for more than about ten minutes. The operators changed the approach and decided they could treat the rice field with the chemical prior to flooding. By the time the field was flooded the chemical had combined with soil particles and did not enter the water in concentrations toxic to fish. In this way it still controlled the insect pest. This chemical was recently registered and the label says "In all the rice growing areas of the U.S. it can be applied post flood", which I think is very hazardous to fish life, because in California the only way they can apply it is before they flood the rice field.

One of the old programs that has been in effect for many years which we thought might be hazardous to fish, was on the north coast where they plant thousands of acres of cut-over timberland with endrin-coated conifer seeds. Endrin is probably the most toxic chemical to fish that we know of. We studied and found that they would have to treat 25 times heavier in order to produce any direct toxic effect on the fish in the streams and also there was no build up of en-

drin so we felt that we couldn't object to this program because of its supposed hazard to fish.

We also have what we call surveillance programs and much of our effort here is keeping track of new chemicals and changes in use practices, and keeping track of other agencies involved in chemical uses.

Our observations on pesticides in the environment cannot be called monitoring studies. Our ability in this line is very limited because monitoring studies are expensive; they take lots of personnel. We have data on a large number of fish species. It gives us some information but is not very useful for analyzing trends of increasing or decreasing levels because none of these species are sampled consistently or on any routine basis. A possible exception is our data on striped bass which we do have for a number of years and we feel that we know more about the levels in this species than in any other. Striped bass is sampled most intensively because it inhabits the Delta. It is the top of the food chain and we would expect, because the Delta receives all of the runoff from the agricultural area of the Sacramento and San Joaquin Valley that this fish would be highly contaminated. This did not prove to be true. Over the years since 1965 the mean level of DDT in this species runs about one and one half parts per million (ppm) and sometimes less than that.

We also have quite a bit of data on salmon. The levels on salmon tend to run less than one ppm with the exception of a winter run in the Sacramento River that we discovered last year. This run apparently doesn't enter the commercial catch, but the levels in this fish are significantly higher than the rest of the fish we have analyzed. This is a light meated salmon that has a very high oil content, something over 20% fat in the flesh.

The residue programs in the marine environment include estuarine monitoring performed by the National Marine Fisheries Service under a contract with the Department. This was started in January of 1966 and was handled by the Marine Resources Region until recently and then the responsibility was given to our project. This program sampled primarily shellfish from estuaries all along the coast of California. The years of data that we have indicate that the levels are relatively constant with the highest levels found in estuaries that drain extensive agricultural areas.

Also, we recently conducted a survey of marine fish along the coast in cooperation with the State Department of Public Health. We sampled Dover sole, boc-

cacio, rockfish, and crab from three broad areas along the coast. We arbitrarily set the limits at the Oregon border and Point Arena for one sampling area, Point Arena and Point Conception for another, and Point Conception and the Mexican Border for the third. The levels found were less than one half ppm, but they were highest in the southern California area.

Question: Was that in the flesh?

Linn: Yes. Unless I say otherwise I am talking about wet flesh basis and I am talking about total DDT which includes DDE and DDD.

We have quite a bit of data on other marine species—none collected over an extended period of time. The highest levels we have found have been in anchovy and jack mackerel. All of the high levels (by high I mean more than two tenths ppm) have been in the southern California area except one sablefish caught off Eureka that had over nine ppm DDT.

We are presently starting a modest monitoring program in cooperation with the Marine Resources Region. We plan to sample quarterly six species of fish in five stations along the coast. These species would be bocaccio, rockfish, anchovy, and white croaker in the south, and surf perch in the north. We want to sample the anchovy because it is a forage fish, it has high levels and it is migratory. The bocaccio is more of a localized species and the white croaker and surf perch reflect the levels in inshore waters.

In addition to this program, we also plan a more intensive sampling of the white croaker population between Dana Point and Pt. Conception. We want to see if we can pinpoint the source of heavy DDT concentrations in the Los Angeles area. We plan to have in the neighborhood of 100 sampling stations in this case.

As mentioned earlier, most of our data on metals is on mercury and most of our data on mercury is from the striped bass population. The situation appears that all fish that are over or slightly over the legal minimum size of 4 lbs. (legal limit, 16 inches) have between one half and one ppm mercury.

That concludes my presentation.

Question: Will this PCB data be made available?

Linn: Yes.

Question: I wanted to ask about your registration program. I gathered that you actually determine what pesticides are used in the fields, that you don't actually keep track of the pesticides prior to the time they are in the field. Is that correct?

Linn: Any pesticide sold in California must be registered by the state. Most have a federal label or federal registration also, but a chemical manufactured and sold exclusively in California, has only a state registration.

Question: Does that mean that each branch has—that each drug is tagged—and you can follow it to the time of original production?

Linn: No. Chemicals are re-registered every year. In that time, if there is anything that needs to be done in terms of further restriction of the pesticide or

abolition or rejection of the chemical, existing supplies can be withheld, but there is no way to tag batches that I know of.

Question: It is not that there is no way, other than there is no law to take care of this. Apparently this is one of the missing links right now. You don't really discover where it is until you get into the field and there must be other uses or other handlings of pesticides which are very difficult to locate. You mentioned you did some sampling on shellfish in estuaries. What levels did you find?

Linn: Generally less than one ppm.

Question: The shellfish population doesn't seem to be as drastically affected as the fish population?

Linn: Right. They don't have as high levels. What the influence is we don't know.

Question: Do you have any levels of DDT on things like carp and catfish in the Delta?

Linn: We have limited amounts of data on carp and catfish. It is generally lower than striped bass.

Question: Do you know if there has been any sampling analyzed for striped bass 10 or 15 years old that have been preserved, analyzed for mercury?

Linn: We haven't done any, someone else may have.

Question: What plans are there that you can see in the near future for getting legislative action regarding strengthening the advisory capacity of the University—some way of getting at the farmers—is there any chance that through the Fish and Game Department you could get more strength?

Linn: One of the things that you get asked, and it has been tried several years and it is closer to passing now than ever before, is to require that pesticide use be controlled through prescription and that the people that do this be entomologists like Dr. Vandebosch and some of the people that understand both the need for pest control and the adverse effects that might result. Sort of like prescribing drugs. A committee is looking into the data to make this acceptable to the agricultural community and this appears to be a fine approach to controlling the use of pesticides and hopefully preventing some of the harmful effects.

Question: Is DDT being used today? Yes. You say you control the application per acre?

Linn: No. What I said is that we have a computerized reporting system that puts practically all uses of pesticides on cards (some minor uses aren't reported) and relays the data to Sacramento once a month. So what we have is a reporting of how much, where, for what purpose, etc.

Question: What is the phasing out program?

Linn: The phasing out program was designed to get rid of major uses of DDT by the end of 1971. This is a program depending on the University's ability to come up with a satisfactory replacement. At present there have been 50 or 60 uses of DDT that have been discontinued, but there are still considerable amounts being used. One of the major crops on which it will not be used after this year is cotton.

Question: I know you haven't been monitoring the mercury very long but would you care to speculate at all on what the possible sources might be?

Linn: Well it is hard to say. The most extensive levels have been found in the Delta and you would think this might be three things—industry pollution, mercury mines, or mercury lost used during the gold mining era. We also found mercury contamination in

fish, from e.g., Gibraltar Reservoir near Santa Barbara where there is no industry but there is an active mercury mine draining into it.

Question: I was wondering if this is the probable source. If so, this same level of contamination may have existed for a number of years without our knowing it.

Linn: This is certainly possible.