The Hollandale population was the most resistant to the insecticides followed by the Belzoni, Sky Lake and Bluff Lake populations. The resistant shrimp were from one to 25 times more resistant to the test compounds than the Bluff Lake shrimp. In general, resistance was pronounced toward organochlorine and carbamate insecticides and either weak or absent toward the organophosphorus insecticides. The symptoms of poisoning were hyperactivity, tremoring appendages, loss of equilibrium followed by paralysis and death. In the field test, the mortality of the Bluff Lake shrimp was 66% higher than native resistant shrimp. Mosquito fish samples collected from the Hollandale ditch at the time of the study contained about 32.5 to 33.0 ppm DDT and from about 89.2 to 43 ppm toxaphene.

71-1502. Parker, Jr., R. O. (Bureau of Commercial Fisheries, Center for Estuarine and Menhaden Res., Beaufort, N. C. 28516). Surfacing of dead fish following application of rotenone. *Trans. Am. Fisheries Soc. 99(4): 805-7; 1970.* (11 references)

The rate and extent of surfacing of rotenone-killed fish was investigated in the laboratory and in the field. Special attention was given to the effect of environmental factors such as water temperature and depth on the rate of surfacing of rotenone-poisoned centrarchids. The fish used in the experiments included bluegill (*Lepomis macrochirus*), green sunfish (*L. cyanellus*), golden shiner, (*Notemigonus crysoleucas*), goldfish (*Carassius auratus*) and brown bullhead (*Ictalurus nebulosis*). The total length of the fish ranged from 1 to 9.1 in. Water temperature ranged from 25.0 to 8.15 F. The desired concentrations of rotenone were prepared from 5% rotenone. The field and laboratory data indicated that practically all rotenone-killed fish can be expected to surface within 1 week in water that is above 60 F in temperature, is at least 10 ft in depth and does not contain abundant, rooted aquatic plants. Further investigations should be conducted to determine the influence of temperature and water depths exceeding 10 ft on the rate of surfacing of rotenoned fish of these different species.

71-1503. Dugel'nyi, G. A. (Dept. of Eye Diseases, Ternopol' Medical Inst., Ternopol', USSR). The effect of some organophosphorus compounds used in agriculture on the organ of vision. *Vestn. Oftal'mol. No. 2: 72-5; 1970.* (6 references) (Russian)

The effects of two insecticides–methyl Systox (methyl mercaptophos) and intrathion (preparation M-81)–on the eye were studied experimentally. The two compounds were administered via the mucous membrane. The right eyes only of 102 rabbits were filled with 0.1, 1.0 or 10% emulsions of methyl Systox or 0.04, 1.0 or 10% emulsions of intrathion. There were 18 controls (the left eye). The general condition of the animals was observed; changes in the eyelids, conjunctiva and eyeball were followed by tonometry, elastotonometry, measurement of pupil size, gonioscopy and tonography. The results showed that filling the rabbit eye with the two insecticides led to poisoning with the same clinical picture as is seen with other routes of organophosphate administration, which, as a rule, was more pronounced at the higher concentrations. The detailed effects included signs of burn injuries to the eyes. There were inconsistent and nonpersistent biphasic changes in intraocular pressure, pupil contraction, narrowing of the angle of the anterior chamber and a slowed outflow and diminished secretion of the chamber fluid. The intensity of these pathological changes depended on the concentration of the insecticides in the emulsions.

71-1504. Platonow, N. S.; Funnell, H. S. (Lab. of Toxicology, Dept. of Biomedical Sciences, Ontario Veterinary College, U. of Guelph, Guelph, Ontario, Canada). Anti-androgenic-like effect of polychlorinated biphenyls in cockerels. *Vet. Record 88(4): 109-10; 1971.* (7 references)

The results of some metabolic studies of PCBs (specifically Arochlor 1254) in White Leghorn cockerels are presented in a letter to the editor. Cockerels given 500 ppm PCBs from 1 day of age in a commercial ration had noticeably smaller combs and wattles. Mortality was high, the birds dying between the third and tenth weeks of feeding. At 250 ppm, mortality appeared only by the 13th week of the trial. Six groups of six birds each were then tested to ascertain the PCB effects on body weight, liver, comb, testes and the adrenals. They were fed at 250 ppm for 6, 9 and 13 weeks. Body weight did not show any appreciable change until the ninth week when it was 3/4 of that of the controls; by week 13, the PCB-fed cockerels weighed less than 2/3 as much as did the controls. Liver weights were slightly higher throughout the experiment than in the controls; in terms of the percentage of total body weight, an appreciable increase was noted towards the 13th week. There was no change in the adrenals. The combs showed the striking change already mentioned. Testicular weights were similar between controls and the test birds at 6 weeks. During the next 3 weeks to the 13th week, a significant difference developed, the testes of the PCB-treated birds weighing only ½ the amount of those of the controls. The slowing of the comb growth appeared before the similar effect in the testes. Data for the results are tabulated. The present observation makes evident the need for further studies of the effects of PCBs on the hormonal system of birds.

71-1505. Whitehead, C. C. (Poultry Res. Centre, Agricultural Res. Council, West Mains Road, Edinburg, Scotland). The effects of pesticides on production in poultry. *Vet. Record 88(5): 114-7; 1971.* (29 references)

A review was made of the literature concerning the effects of some organochlorine, organophosphorus and carbamate pesticides as well as fumigants and seed dressings on the growth, feed conversion efficiency, egg production, egg size, shell thickness and viability of poultry. Experiments with organochlorine pesticides have shown that DDT has a relatively low toxicity to poultry. The lethal doses for laying hens and for turkeys have been found to be 5000 and 3000 ppm of the diet, respectively. A dose rate of 750 ppm DDT has been shown to inhibit the growth rate of turkey poults. Dietary doses of 300 ppm has caused reduction of egg production in hens, while 600 ppm has decreased the hatchability of eggs. DDT has also been known to reduce the

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