EFFECT OF AGE AND SEX ON RESISTANCE OF DAPHNIDS TO MERCURIC CHLORIDE

IN connection with an experiment involving the killing rate of daphnids by mercuric chloride[1] it seemed desirable to test the resistance of the different ages and sexes of these animals to the poison.

The animals were *Daphnia magna,* grown in the laboratory at Iowa City in the culture medium of Banta.[2] All those used for the age experiment were parthenogenetic females of the same clone; those of the different sexes were in their early adult instars.

Two methods of noting the killing time were used. In one series, the animals were observed individually under the microscope and the killing time (time of the last observable body movement) noted with a stop-watch. In the other series, the animals were placed in the poison solution in groups of 20 to 30, and at the end of a specified time the action of the poison stopped or slowed down, either by the action of a neutralizing chemical like potassium ferrocyanide, which had been previously tested and found to be non-toxic in the concentration used, or by the addition of enough water to throw the whole mixture into a dilution far below the lethal concentration for the time interval involved. The number dead and alive were roughly determined and the animals returned to the normal culture medium as soon as possible. They were then allowed to stand for a time sufficient to separate definitely into two groups, dead and alive. Doubtful cases were examined microscopically before being classified.

A dilute solution (0.0003N) was used for the group method of killing in order to have the total elapsed time fairly long. For the individual observations a more concentrated solution (0.01N) gave killing times more convenient for stop-watch notation.

In the accompanying tables the killing time is the time taken to kill 50 per cent. of the animals. This is determined by plotting the data in the form of a sigmoid curve (per cent. dead against elapsed time) and taking for the killing time the point of intersection of this killing curve with the line drawn through 50 per cent. dead. All times are given in seconds.

TABLE I

INDIVIDUAL OBSERVATION, 0.01N $HgCl_2$, 26° C.

Instar	Killing time
1	77
2	86
3	98
4	111
5	113
6	134
7	136

TABLE II

GROUP METHOD OF KILLING, INSTARS 4 AND 5 TREATED TOGETHER, 0.0003N $HgCl_2$, 25° C.

Instar	Killing time
1	380
2	402
3	444
4 & 5	460
6	520

TABLE III

GROUP METHOD, 0.0003N, 26° C.

Males	400
Parth. females	442
Sexual females	462

(In the series summarized in Table II, instars 4 and 5 were treated together because of the close similarity between these two ages shown in the preceding series. Instar 7 was omitted because of the loss of the culture by accident before the completion of the experiments.)

The data indicate that there is a decrease in the susceptibility of *Daphnia magna* to the poison as the animals grow older and that the males are more susceptible than the females, with the parthenogenetic forms intermediate between the sexual forms. These differences are no doubt associated with the metabolic differences of the different ages and sexes, as indicated by MacArthur and Baillie[3] and others.

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[1] Breukelman, "Physiological Zoology," 5, 207, 1932.

[2] Banta, SCIENCE, 53, 557, 1921.

[3] MacArthur and Baillie, *Jour. Exp. Zool.*, 53, 250, 1929.

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