E. odoratum inhibited growth in the test seedlings significantly, to varying degrees. As growth inhibition was evident even in the seedlings grown in soil, the effect was not osmotic but due to growth inhibitor(s) of the leachate. Phenolics and alkaloids are among the reported allelopathic agents[2]. In the present study both these classes of compounds were detected in the leachates and the growth inhibition due to alkaloids was demonstrated. The total phenolic content of the leachate was 3·43, 2·89 and 1·73 mg/g dry weight of the leaf, cypsella and root material, respectively. It is interesting to note that the total phenolic content and the growth inhibition caused by the leachate from different parts of the weed followed the same order.

In nature, the inhibitors from the fresh leaves of allelopathic speciex are washed down to the soil by rain and from the dried leaves that are shed to the ground, the inhibitors leach out when rain-soaked or during decay[2]. Though the inhibitors thus added to the soil are subjected to slow microbial degradation, as *E. odoratum*, the perennial weed producing annually large number of leaves that are shed, adds large amounts of inhibitors to the soil from both the intact and the shed ones, the allelopathic action of the weed would still be significant. Hence the suppression of plantation crops at their early stages as also the reported damage of leguminous cover crops[1] by Eupalorium can be at least partly, allelopathic.

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TOXICITY OF SUMITHION AND SEVIN TO THE FRESHWATER FISH, *SAROTHERODON MOSSAMBICUS* (PETERS)

ORGANOPHOSPHORUS and carbamate insecticides are now extensively used in the place of organochlorine compounds on account of their less residual action. But unfortunately little information is available on the toxicity of these compounds to the freshwater fish, which will form a part of human diet. Also tolerance limits were not known in many freshwater fish although production and use of these insecticides was increasing every year. There are very few records of TLm (median tolerance limit) values for different fish. The data on Lc_{60} (concentration sufficient to kill 50% of the total population) values of fish with different insecticides will be highly useful in the final evaluation of the extent of pollution of aquatic environment by agricultural chemicals. Furthermore, with the knowledge of tolerance limits in fish and other aquatic organisms, it would be easy to establish limits and levels of acceptability of toxic agents by the biotic components of aquatic environment. The present communication reports tolerance limits and toxic symptoms of freshwater teleost *S. mossambicus* to organophosphate insecticide, sumithion and carbamate, sevin.

Maintenance, size and weight range of fish used have been described earlier[1]. Sumithion, emulsifiable concentrate (E.C. 50%) (chemically known as 0, 0 dimethyl 0-(3 methyl-4-nitrophenyl) phosphorothionate and sevin, (1-naphthyl, N-methyl carbamate obtained as wettable powder (WDP 50%) were used as experimental pollutants. The abundant availability of *S. mossambicus* in rice fields and irrigation canals and the extensive use of sumithion and sevin by local agricultural workers have prompted the authors to undertake the investigation. Commercial grade insecticides were used in the investigation as they simulate better field conditions. Lc_{50} value was computed by probit method[2].

The fish were subjected to static bioassay. The pH of the water was 7·0 and its temperature 28–30° C. The dissolved oxygen content (D.O.) of water was 5 mg. per litre. With sumithion, the Lc_{50} at 24, 48 and 72 hr exposure was 8, 6 and 5 ppm respectively. Similarly Lc_{50} of Sevin at 24, 48 and 72 hr exposure was 13, 10 and 8 ppm respectively. There was no change in pH, temperature and D.O. content of the water after the addition of insecticides. This was in accordance with the observations of Henderson *et al.*[3] who showed that mild changes in water quality had no effect on toxicity increment. The toxicity of insecticides also varies with the type of compound. Phosphorothionate insecticide like Sumithion is more toxic to fish than the carbamate compound. This could be due to formation of several degradative products such as dimethyl sumithion and dimethyl phosphorothioic acid etc. Similarly in the case of carbaryl the toxic effect could be due to formation of 1 naphthol. The symptoms of poisoning such as increased irritability, hyper excitation, and tremors of the body were more severe in sumithion exposed fish than in Sevin treated fish. This could be due to the fact that in the case of Carbaryl, the hydrolysis

rate is quicker as compared with sumithion. Clonic (repetitive movements) and tonic (rigid body) convulsions were found and fish lost their equilibrium and swam on their sides after their transfer to sumithion and Sevin. Similarly gill opercular movements increased initially but later decreased and examination of the gills of Sumithion and Sevin exposed fish exhibited formation of "coagulation film" (disappearance of mucus membrane). Autopsy of sumithion treated fish revealed highly congested visceral parts. The intestine was found to be completely filled with water and occupied a major part in the body. Presumably failure of osmoregulatory machinery would have resulted in the storage of water. Experiments to study the effect of pesticides on the ionic composition of the fish are in progress.

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SEX RATIO IN *ACANTHOSENTIS OLIGOSPINUS* AN ACANTHOCEPHALAN PARASITE FROM THE GUT OF *MYSTUS GULIO*

THE acanthocephalans are unique endoparasitic pseudocoelomate vermiform organisms for which the intermediate host is generally an aquatic invertebrate and the final host a vertebrate.

Live *Mystus gulio* were brought to the laboratory and dissected in 0·85% sodium chloride solution. The alimentary canal of each fish was transferred to a petri-dish containing 0·85% sodium chloride, uncoiled and incised lengthwise using a fine needle to collect the acanthocephalan parasite, *Acanthosentis oligospinus*.

Table 1 shows the details of the data collected. Large number of parasites were available during September, October, November and December (the North-East monsoon period) when nutrients and intermediate hosts are available in plenty.

The sex ratio in the whole population of juvenile *Echinorhynchus truttae* collected from *Gammarus pungens padanus* was found to be 1 : 1[1] and cystacanths of *Moniliformis moniliformis* collected from the haemocoele of *Periplaneta americana*, also revealed the same ratio (unpublished). Crompton[2] reported that a sex ratio of 1 : 1 exists in the earlier part of the infection, and that the sex ratio of acanthocephalans appears to be under genetic control not influenced by the environment provided by the intermediate host.

TABLE I

Degree of infestation of Acanthosentis oligospinus *in the gut of* Mystus gulio *during* 1978

Month	No. of fish examined	No. of fish infected
January	9	9
February	10	6
March	12	8
April	15	12
May	15	14
June	7	7
July	14	11
August	10	7
September	16	6
October	11	11
November	8	8
December	12	12

Month	Total number of parasites	Percentage of males	Percentage of females
January	50	52·00	48·00
February	32	46·88	53·12
March	32	53·12	46·88
April	85	50·59	49·41
May	82	47·56	52·44
June	74	48·65	51·35
July	26	46·15	53·85
August	275	49·46	50·54
September	360	49·72	50·28
October	445	49·66	50·34
November	320	49·38	50·62
December	530	49·81	50·19

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