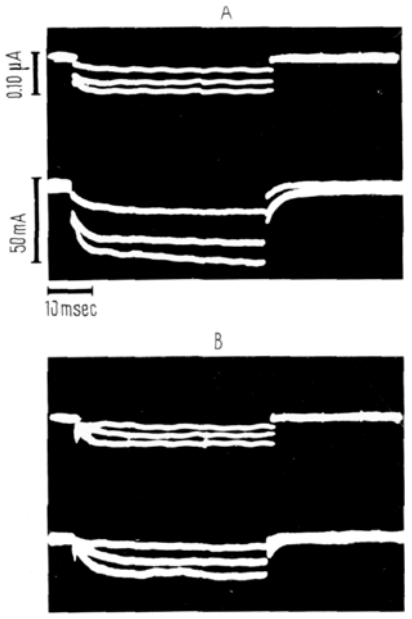
Since we can assume that the depolarization phase of membrane is due to the penetration of sodium ions inside the fibre, if the permeability to potassium and chlorine is nil when the depolarization rate is maximum, the equation of HODGKIN and HUXLEY[8] becomes:

$$I_i = -C_m \dot{V}_d = g_{Na}(V - V_{Na})$$

allowing the calculation of g_{Na}.

Using a capacity value, C_m, of 3.8 μF, a maximum depolarization rate, $\dot{V}_d$, of 790 V/sec ($V = -55$ mV = membrane potential; $V_{Na} = +30$ mV = equilibrium potential for $[Na^+]$) a mean value of maximum sodium conductance, g_{Na}, of 35.3 ± 18.8 mmho/cm² at 38°C is obtained.

Such a value is in good agreement with that determined in the giant axon of *Loligo*[9], but there are no data, in the literature, allowing a comparison with the striated muscle of mammals.



Electrotonic potential changes (lower traces in each record) for three different current intensities (top traces) in the same muscle fibre. Electrode separation: A = 50 μ, B = 530 μ.

Seven fibre data of guinca-pig muscle at 38°C. Bottom = means and standard deviations

$\frac{1}{2}\sqrt{r_m r_i}$ (Ω)	$\lambda = \sqrt{\frac{r_m}{r_i}}$ (mm)	τ_m (msec)	ϱ (μ)	R_m (Ω cm²)	C_m (μF/cm²)
4.65×10^5	0.8	2	18.4	860	2.32
5.10×10^5	0.67	2	16.2	633	3.15
4.50×10^5	0.56	3.75	15.7	500	7.5
4.30×10^5	0.68	4.1	17.7	648	6.33
4.55×10^5	0.76	2.3	18.2	792	2.9
6.00×10^5	0.7	1.25	15.2	800	1.56
6.70×10^5	0.78	2.9	15.2	1000	2.9
5.11×10^5	0.707	2.61	16.6	747.4	3.8
$\pm 0.83 \times 10^5$	± 0.076	± 0.94	± 1.3	± 152	± 2.0

Riassunto. Nella singola fibra muscolare di cavia a 38°C sono state determinate, applicando la «square pulse analysis», la resistenza, la costante di tempo, la costante di spazio e la capacità della membrana a riposo. È stato inoltre possibile calcolare la massima conduttanza per il sodio, g_{Na}, che è risultata di 35,3 mmho/cm².

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Istituto di Fisiologia Generale dell'Università, Torino (Italia), March 1, 1965.

[8] A. L. HODGKIN and A. F. HUXLEY, J. Physiol. *117*, 500 (1952).
[9] A. L. HODGKIN and A. F. HUXLEY, J. Physiol. *116*, 449 (1952).

On the Use of Phosphamidon[1] for Eradication of Fresh Water Fish Predators

The importance of discovering specific chemicals which would help in eradicating unwanted and harmful fauna from fish nursery and rearing ponds, without causing damage to the fish being reared, cannot be over-emphasized[2]. The authors have conducted experiments with a number of poisons with a view to eradicating predatory insects and harmful or predatory fish commonly found in Indian fresh-water reservoirs in which profitable carps are being reared. The present report deals with the results obtained by experiments with a water-soluble, recent, systemic insecticide, phosphamidon (2-chloro-2-diethylcarbamoyl-1-methylvinyl-dimethyl phosphate), which promises to be highly useful for the purpose in view.

The poison was tried on a number of carps (fry and fingerlings), predatory fishes (of different age) and aquatic predatory insects. Experiments were carried out in the laboratory at room temperature (about 26–33.5°C) in battery jars in which, as a rule, five test animals were kept in 8 l of water containing different quantities of the insecticide for a maximum period of 168 h during which no artificial aeration was made, nor any food supplied. Several repetitions were made of each experiment, which was invariably accompanied by a control in which the same number of test animals, of the same species and of about the same age and size, were kept in the same quantity of water, but without poison.

The Table gives the minimum lethal doses of phosphamidon in ppm which caused complete or near complete mortality of only the more important animals experimented upon within the maximum experimental time.

[1] Prepared and sold under the name of 'Dimecron 100' by Ciba Basel, (Switzerland).
[2] JOHN F. LES VEAUX, Progr. Fish Culturist *21*, 99 (1959).

Minimum lethal doses of phosphamidon on test animals

Name of test animal	Average size (in mm)	LD_{100} (in ppm)	Average time for lethal action (in h)
(a) Fishes:			
Labeo rohita (Ham.)			
fry	24.4	150	34.6 –101.7
early fingerling	42.5	200	29.1 – 61.2
late fingerling	87.1	250	13.8 –109.6
Amphipnous cuchia (Ham.)	139.0	20	62.0
Channa punctatus (Bl.)			
fry	21.8	30	2.1 –135.6
fingerling	43.2	40	4.9 – 52.9
adult	108.0	50	70.5
Nandus nandus (Ham.)	46.25	50	19.6 – 31.1
Trichogaster fasciatus (Bl. Schn.)			
adult	66.1	50	51.7 – 72.2
Anabas testudineus (Bl.) adult	86.0	100	64.9 –138.25
Heteropneustes fossilis (Bl.)			
fry	35.16	100	44.36–130.4
fingerling	57.7	110	36.9 – 60.9
Mystus vittatus (Bl.) adult	59.9	125	42.25– 50.75
(b) Insects:			
Dysticus sp. adult	10.25	2	93.3 –115.3
Dragon-fly nymph	12.7	2	61.9
Notonecta sp. adult	8.12	4	4.9 – 68.4
Sphaerodema sp. adult	24.0	4	21.5 – 67.5
Ranatra sp. adult	30.0	5	36.4 – 93.4
Nepa sp. adult	18.2	5	14.75–134.75
Belostoma sp. adult	77.0	10	19.0
Hydrophilus sp. adult	30.0	10	13.0

The results contradict the assertion of GANGULY and MITRA[3], who think that eradication of insects from nursery tanks by the use of chemicals is not possible, and that they can be eliminated only with the help of small mesh drag nets.

The results given in the Table also show that, while even the young stages (fry and fingerlings) of the carp *Labeo* die in 150–250 ppm of phosphamidon, the predatory fishes *Nandus, Amphipnous, Channa* (fry, fingerling and adult), and *Trichogaster*[4] (adult) are eradicated in 50 ppm or less. *Heteropneustes* (fry and fingerling) and *Anabas* and *Mystus* (adults) die in a concentration of 100–125 ppm. All insect predators experimented upon are unable to survive even as low a concentration of the poison as 10 ppm or lower.

In other words, by using a concentration of 10 ppm of phosphamidon, it appears that most insect predators can be eradicated from fresh-water reservoirs without affecting the fish population at all, and by employing 100–125 ppm of the chemical most of the predatory fish can also be removed.

Zusammenfassung. Laboratoriumsexperimente mit Phosphamidon ergeben eine günstige kritische Dosisempfindlichkeit für Labeo-Karpfen (150–250 ppm). Es gelingt so leicht, Wasserinsekten (2–10 ppm) und Raubfischstadien (20–125 ppm) aus den Frischwasserreservoiren zu eliminieren.

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Department of Zoology, Bihar University, Muzaffarpur (India), January 25, 1965.

[3] D. N. GANGULY and B. MITRA, Ind. Agric. *5*, 184 (1961).

[4] The predatory activities of *Trichogaster fasciatus* have been observed in this laboratory.

Structure of the Centromere in Telocentric Chromosomes

KOSLOV[1] and SCHRADER[2] maintained that centromeres possessed one spherule for every chromatid. Some time after this (1947) it was proved by OSTERGREN[3] that the two spherules were longitudinally double. Then, LIMA-DE-FARIA[4-11], in a series of excellent studies published between 1949 and 1958, dealing with the centromere in chromosomes in meiosis and mitosis, came to the conclusion that the centromeres in pachytene (in the case of rye) were composed of three zones: an inner zone, formed by two small chromomeres, on the threshold of microscopic visibility; a second zone, outside this, consisting of the two larger chromomeres; and a third zone consisting of fibres connecting the larger chromomeres in the second zone with the arms. This basic type was described by TJIO and LEVAN[12] in the prophase and metaphase of the mitosis, but the innermost zone of small chromomeres could not be observed. On the other hand, in their study of ascitic tumour cells in mice, TJIO and LEVAN[13] described the terminal centromeres of the chromosomes in their case as consisting of a single chromomere which was, however, prolonged in such a way as sometimes to give the impression of a series of small chromomeres one next to another.

Material and methods. The material for observation was from chromosomes belonging to the cells of a hypertriploid Ehrlich's ascitis tumour. Processing consisted of 20 min exposure to hypotonicity achieved by adding three times the volume of distilled water to the ascitis liquid. The fixation and spreading was made according to TJIO and WHANG's[14] technique, using Giemsa for staining.

Observations and discussion. In the opinion of TJIO and LEVAN[13], the observation of the centromere in the telo-

[1] V. E. KOSLOV, Biol. Zhurnal *6*, 759 (1937).
[2] F. SCHRADER, Chromosoma *1*, 230 (1939).
[3] G. OSTERGREN, Botaniska Notiser *176* (1947).
[4] A. LIMA-DE-FARIA, Hereditas *35*, 77 (1949).
[5] A. LIMA-DE-FARIA, Chromosoma *5*, 1, 68 (1952).
[6] A. LIMA-DE-FARIA, Chromosoma *6*, 33, 44 (1953).
[7] A. LIMA-DE-FARIA, Hereditas *41*, 238, 240 (1955).
[8] A. LIMA-DE-FARIA, Hereditas *42*, 85, 160 (1956).
[9] A. LIMA-DE-FARIA, Chromosoma *6*, 330 (1954).
[10] A. LIMA-DE-FARIA, Hereditas *43*, 462 (1957).
[11] A. LIMA-DE-FARIA, Int. Rev. Cytol. *7*, 123 (1958).
[12] J. H. TJIO and A. LEVAN, Nature *165*, 368 (1950).
[13] J. H. TJIO and A. LEVAN, Lunds Universitets Arsskrift, N. F. Avd. 2, Vol. 50. Nr. 15 (1954).
[14] J. H. TJIO and J. WHANG, Stain Technol. *37*, 17 (1962).