

**SALINITY TOLERANCE OF *CULEX SITIENS* WIED. (DIPTERA: CULICIDAE) LARVAE IN LABORATORY CONDITION**

SANTANU RAY and AMALESH CHOUDHURY

Department of Marine Science, Calcutta University, Calcutta 700 019, India.

SEVERAL tideland mosquito species transmit many tropical diseases<sup>1</sup>. The estuarine regions of coastal West Bengal are relatively free from such diseases but the irrational clearing of the virgin mangrove forests in these areas has resulted in greater incidence of the diseases due to the formation of numerous tidal pools which get exposed to sunlight accelerating the breeding of some mosquito species including *Culex sitiens*. To overcome the situation it is essential to obtain sufficient data on the ecology of *C. sitiens* in saline environment.

Eggs of *C. sitiens* were collected from tidal ditches of Harinbari mudflat of Sagar Island. After hatching, the 1st instar larvae were collected and their salinity tolerance was studied in a test range of 0–50‰ for 216 h at room temperature and control at 28.2‰ salinity was maintained. Test media were

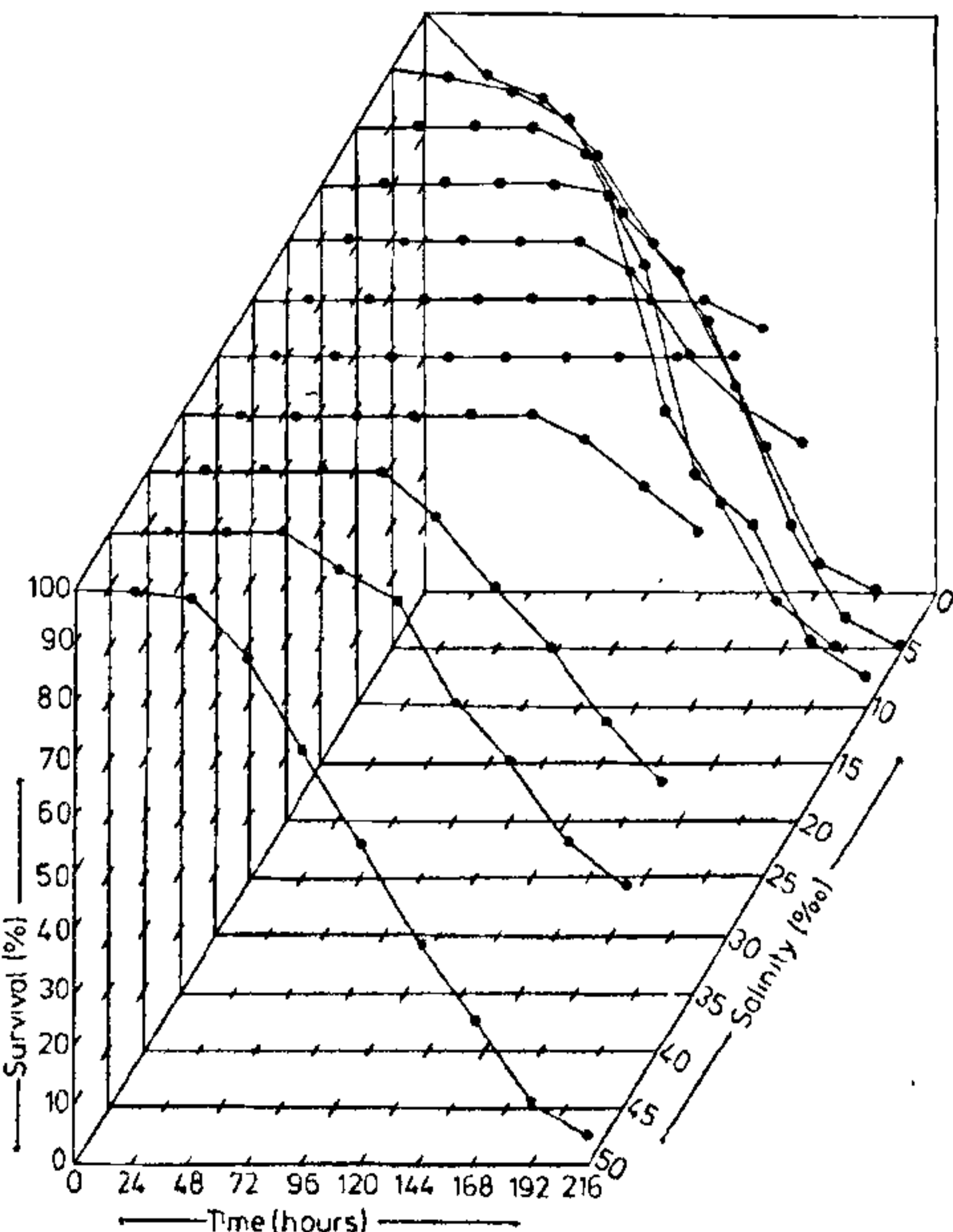


Figure 1. Mean percentage survival of *Culex sitiens* larvae in different test salinities at varying exposure periods.

Table 1 Observed and expected survivability and corresponding confidence limit

Dose (salinity ‰)	Survival/ tested	Observed per cent survival	Expected per cent survival	Differences	$\chi^2$
5	0/60	0(0.3)	1.2	0.9	0.0080
10	3/60	5	6.5	1.5	0.0037
15	12/60	20	25.0	5.0	0.0140
20	39/60	65	61.0	4.0	0.0065
25	57/60	95	86.5	8.5	0.0620
30	60/60	100(99.2)	97.5	1.7	0.0120

TL84—(84% survival in) 24.4‰ salinity; TL16—(16% survival in) 13.13‰ salinity; TLM—(50% survival in) 18.3‰ salinity; Slope—1.35; 95% confidence limit 1.408/1.294.

changed every alternate day. Mean tolerance limit was determined following the method of Litchfield and Wilcoxon<sup>2</sup>.

Figure 1 shows mean percentage of survivals in different test salinities at varying exposure periods. Table 1 shows observed and expected survivals and their corresponding confidence limit.

In 25, 30 and 35‰ salinities the mortality percentage was minimum and recorded only from 192 h and 168 h onwards, their survival values after 216 h were 95% and 80% respectively. The most suitable salinity medium for this larvae was 30‰ and 100% survival was recorded in this salinity and also in the control salinity (28.2‰). The larvae behaved normally in these salinities over the entire experimental period. The TLM, TL84 and TL16 values were 18.3‰, 24.4‰ and 13.3‰ respectively in this experiment. The tolerable salinity was between 20 and 40‰ and the TLM value (216 h) was 18.3‰ salinity.

Gravid females of *C. sitiens* prefer a salinity of 30‰ for oviposition as well as hatching. During April and May eggs were found in the tidal ditches of Harinbari mudflat, their salinities ranging from 25 to 35‰. These ditches during the southwest monsoon months (July to October) are flooded with the highest tidal water with salinity ranging from 2 to 5‰. But during the rest of the year (November to June) tidal water cannot reach the supralittoral zone due to lower tidal amplitude, and consequently due to evaporation, salinities of ditches are increased to the maximum (25 to 35‰)<sup>3</sup>

Saltmarsh insects exhibit a wide range of tolerance to salinity variations. Species such as *Chironomus aprillinus* Meigen can withstand brackish water conditions, some species such as *Aedes taeniorhyn-*

*chius* Wied. can tolerate prolonged exposure to salinity, whereas others like *Aedes caspius* Fallas, *Aedes detritus* Haliday and *Opifex fascus* Hutton are adapted to hypersaline conditions<sup>4</sup>. Presently *C. sitiens* was found to be a euryhaline species.

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1. Omeara, G. F. and Edman, J. D., *Biol. Bull.*, 1975, **149**, 384.
2. Litchfield, J. T. and Wilcoxon, F., *J. Pharmacol. Exp. Ther.*, 1949, **96**, 99.
3. Ray, S. and Choudhury, A., *Post Symp. Proc. Nat. Symp. Biol. Util. Conserv. Mang.*, 1985, (in press).
4. Clements, A. N., *The physiology of mosquitoes*, Pergamon Press, Oxford, 1963.

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