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Short Communication

A simple device for the separation of weak larvae of *Macrobrachium rosenbergii* (De Man)

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Larvae of *Macrobrachium rosenbergii* (De Man) are photopositive (Ling 1969a,b) and negatively rheotactic. While investigating larval diseases of *M. rosenbergii* it was observed that weak larvae failed to show both these responses. It was felt that this lack of response could be used to develop a device for separating the weak larvae from the apparently healthy ones. Such a device would be a valuable tool for assessing the health of a batch in terms of the percentage of 'healthy' and 'weak' larvae. What follows is a description and mode of operation of the 'photo-flow' device developed by the authors.

The photo-flow device consists of the following parts (Fig. 1). A rectangular opaque (dark) chamber receives light through a narrow transparent area at the top from a light source (60 W electric bulb) mounted 25 cm away. The dark chamber is connected to a similar-sized transparent (light) chamber via a 'U' tube which has an outlet at the bottom. The 'U' tube is connected to each chamber by flexible rubber tubing. From the top of the light chamber, an air-lift pump lifts water and delivers it through a flexible tube to the top of the dark chamber, thereby creating a current. The top of the dark chamber is fitted with a removable opaque lid preventing the entry of light from any other direction. The dark and light chambers are made of perspex and the 'U' tube of glass.

The apparatus works on the principle that the healthy larvae, which are positively phototactic and negatively rheotactic, remain attracted by the light against the downward flow of water while the weaker ones are carried down by the recirculating water current within the system.

A replicate sample of 15 larvae of the same developmental stage (mysis), and of uniform size, were introduced into the dark chamber and the light was switched on. After 15 min (the time required for the larvae to stabilize) the air-lift pump was switched to maintain a flow rate of 500 ml min^{-1}, and the number of larvae collected in the 'U' tube was recorded at intervals of 30, 300, 600 and 900 s. Separated larvae in the 'U' tube were drawn out through the outlet at the bottom and were marked with 0.01% neutral red dissolved in 15‰ sea water and reintroduced into the dark chamber. The marked larvae had slightly pink colour which differentiated them from the unmarked grey ones. The experiment was repeated six times using the same batch of larvae. A similar experiment was run subsequently using another fresh batch of larvae. The data were analysed using the homogeneity test (Snedecor & Cochran 1967).

The number of larvae introduced, the recoveries made at each interval and the details of the statistical analysis in the two experiments are presented in Table 1. The calculated values of χ^2 in both sets of experiments (0.5558 and 1.1558) were not significant at the 5% level. This indicated that the proportion of weak larvae separated did not vary significantly between the

Table 1 Number of larvae introduced and recoveries made, and details of the statistical analysis

Experiment 1								Experiment 2							
Sample	No. of larvae introduced	Larvae separated during				a_i	p_i	Sample	No. of larvae introduced	Larvae separated during				a_i	p_i
		30 s	5 min	10 min	15 min					30 s	5 min	10 min	15 min		
Unknown	15	2	4	–	–	6	0.40	Unknown	15	1	–	–	–	1	0.07
Separated larvae marked and reintroduced	15	2	3	1	–	6	0.40	Separated larvae marked and reintroduced	15	1	1a	–	–	2	0.13
Separated larvae reintroduced	15	3	1	2	–	6	0.40	Unmarked larvae marked and reintroduced along with others	15	1	1	–	–	2	0.13
Separated larvae reintroduced	15	2	2	2	1a	7	0.47	Separated larvae reintroduced	15	2	–	–	–	2	0.13
Unmarked was marked and reintroduced along with others	15	1	2	2	1	5	0.33	Separated larvae reintroduced	15	1	1	–	–	2	0.13
Separated larvae reintroduced	15	3	2	1	1	6	0.40	Separated larvae reintroduced	15	1	1	1a	–	3	0.20
Total	90					36	0.40	Total	90					12	0.13
		$\chi^2 = 0.5558$								$\chi 2 = 1.1558$					

a_i, No. of larvae collected in the 'U' tube.
p_i, Proportion of animals separated.
[a] Unmarked; rate of water flow, 500 ml min^{-1}; time given to stabilize, 15 min; operational time, 15 min.

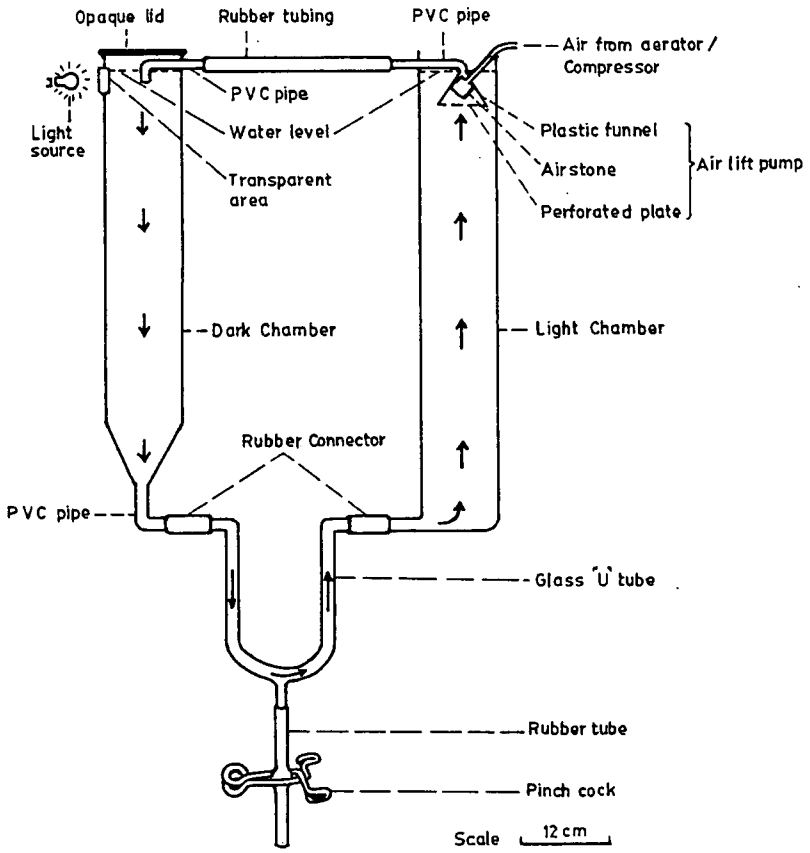

Figure 1 Construction of 'photc flow' device. Arrows demote direction of water flow.

trials in the two sets of experimental series. It was concluded that the apparatus can be used to separate weak larvae of *M. rosenbergii* from apparently healthy ones.

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