The ultrastructure of the cephalic sensory organ (CSO) was first investigated by Bonar (1978) in the veliger larvae of the nudibranch *Phestilla sibogae* and by Chia & Koss (1984) in the larvae of *Rostanga pulchra* (Nudibranchia). The existence of the CSO can also be proved for larvae of several prosobranchs (Uthe, 1991).

The CSO of *Littorina littorea* is situated dorsally between the velar lobes at the level of the shell aperture. It consists of ciliated cells, which are primary sensory cells, adjacent accessory cells and supporting epidermal cells. Cell bodies of the ciliated cells originate in the cerebral commissure and their dendrits pass to the epidermis. Axons of the sensory cells run into the mass of neurites of the cerebral commissure. The flask-shaped sensory cells are characterized by a deep invaginated lumen, with modified cilia arising from the cell surface in the lumen. These cilia are presumed to be non-motile because they lack striated rootlets and show modified microtubuli pattern (7+2, 8+2) (Laverack, 1988). The adjacent accessory cells never possess an invaginated lumen, occasionally cilia and branched microvilli arise from the apical surface. These cells may be sensory, but no direct connection with the nervous system was obvious. The supporting epithelial cells are part of the epidermis and cover the basal portions of the sensory cells and the accessory cells. Ciliated cells almost identical to those described for *Littorina littorea* have been reported from the olfactory organs of several juvenile and adult cephalopods (Wildenburg & Fioroni, 1989). Morphological evidence suggests that the CSO may function in chemoreception and mechanoreception related to substrate selection at settlement, feeding, or other behaviors.

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Maintenance of zonation patterns in *Littorina obtusata* and *L. mariae*

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Littorina obtusata (L.) and *L. mariae* Sacchi et Rastelli are epiphytic littorinids found on sheltered rocky shores (Williams, 1990). On these shores *L. obtusata* reaches a peak of abundance at the mid shore inhabiting *Ascophyllum nodosum* Le Jol which it feeds on. *L. mariae* in contrast lives in the low shore and browses epiphytes off it's host alga *Fucus serratus* (L.). The zonation patterns of these species are very clear and are consistent on sheltered shores. The patterns do not vary annually although the life histories of the two species do ; *L. obtusata* living for 3+years on the perennial *Ascophyllum* whilst *L. mariae* is an annual whose life cycle is closely related to frond shedding in *F. serratus* (Williams, 1992).

Marked individuals of both species were artificially displaced from their host algae and normal vertical range and placed at the preferred height and algae of the other species.

Comparable groups of animals were simply replaced at their normal tidal height on their host algae after handling. The direction and distance of movement was measured to investigate any homing behaviour after 1, 2 and 4 days. Littorinids at mid shore moved further than those at the low shore and there was no difference in the distanced moved by the two species. Displaced animals, however, did show a tendency to move further than the species at their normal range - and this was especially clear after 4 days. Also after 4 days all displaced animals of both species showed directional movement towards their normal "home" zones. This was developed after 2 days for both species.

The differential rates of movement between mid and low shores and also the cues for movement for these species may be the host algae. *Ascophyllum* lies flat on the substrate therefore making lateral movement relatively easy as compared to *F. serratus* which is found in clumps. Also exudates from these algae have been shown to specifically attract and repel these species of littorine (Norton & Manley, 1990) and it is possible that the winkes are using chemicals as a cue.

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The ecology of Hong Kong Littorinids

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Thirteen species of littorinids have been recorded in Hong Kong (Reid, 1992). They belong to the genera *Peasiella*, *Littoraria, Nodilittorina*, *Littorina* and *Mainwaringia*, inhabiting both rocky shore and mangrove areas. These species can easily be distinguished by their shell characters, penis shapes and egg capsule structures.

Studies have been concentrated on the most abundant species of littorinids found around the rocky shores of Hong Kong which are *Nodilittorina trochoides*, *Nodilittorina radiata*, *Nodilittorina vidua* and *Peasiella roepstorffiana*. Three sites of different wave exposure, in sequence of decreasing exposure, Big Wave Bay, Cape d'Aguilar and South Bay, were selected to visit monthly.

The vertical distribution of the littorinids has been examined by belt transects. Vertical distribution is similar in all three sites, with *N. trochoides* and *N. radiata* being abundant higher up the shore than *N. vidua* and *P. roepstorffiana*. The amount of food available for the littorinids is estimated by the concentration of chlorophyll per rock surface area in order to note the relationship between the littorinid distribution and abundance and the food supply. Exclusion experiments will be set up to further investigate the relationship. The popula-