mirabile regenerates on the second intestinal loop. As soon as the anus is open, the intestine becomes functional. The defence organs develop after regeneration of the cloaca. The right respiratory tree regenerates from a fragment of the respiratory organ found in A specimens. The left respiratory tree develops later.

In Pa specimens, regeneration first involves the anterior part of the intestine. The oral podia develop very early before perforation of the mouth. When the mouth has formed, it is surrounded by a ring of oral tentacles. The Polian vesicle forms. The old intestine from P specimens disintegrates and disappears.

Pa specimens then regenerate an intestine with three folds, a transverse vessel and a *rete mirabile*. Pa specimens which have oral tentacles and a functional digestive system can feed. The right respiratory tree is maintained and only regenerates the anterior part in Pa specimen. Defence organs show no signs of regeneration.

H. leucospilota is gonochorismal. All the specimens collected in February had gonads. As the gonadal-somatic ratio was high (22.6), sexual reproduction can take place at this time of the year. Specimens in the process of fission collected at that time of the year also had mature gonads, so during periods of sexual reproduction asexual reproduction can also take place.

Conclusion

This study has proven the existence of fission in *H. leucospilota*. The chronology of the regeneration of organs has been established. Fission for *H. atra* has been the object of more serious and detailed studies on the fission and regeneration rates than has been the case for *H. leucospilota*.

It would be interesting to analyse the role of asexual reproduction in population dynamics for this species and to know if environmental factors play a role in the fission rate.

Is asexual reproduction in this species determined by specific factors, in particular, environmental disturbances which occur frequently in the reefs of Reunion Island?

Fishery in Washington State

by Alex Bradbury

The commercial dive fishery for *Parastichopus californicus* in Washington State, USA, underwent management changes in 1993 following court decisions granting Indian treaty tribes the right to take half of the harvestable resource.

The former management policy of rotating fishing areas such that each area was fished only once every four years had to be abolished in 1994 to allow treaty tribes to harvest annually within their traditional fishing areas. Quotas were reduced roughly one-quarter in each area to accommodate the yearly fishery.

Following this change in management practices, logbook data from non-Indian divers has been monitored to detect shifts in either catch-per-unit-effort (CPUE) or mean harvest depth. Three seasons have elapsed since the management shift to yearly quotas: 1994, 1995 and 1996.

Mean CPUE and its variance is derived from log normalised diver logbook data and is reported as kg of split, eviscerated, and drained sea cucumber per hour of diving. For the 1994, 1995 and 1996 fishing seasons, CPUE has been 66 kg, 64 kg, and 61 kg per diver-hour, respectively. There was no statistically-significant difference between these CPUEs for the last three seasons (coefficient of variation or CV for the three means was 2.2%, 1.9% and 1.9% respectively).

Mean harvest depth for the 1994, 1995 and 1996 fishing seasons was 15.7 m, 16.4 m and 14.6 m, respectively.

This preliminary analysis suggests that there have been no significant changes in either mean catch rate or mean harvest depth thus far following the shift from rotational area management to yearly statewide fishing in all areas. However, Washington Department of Fish and Wildlife will continue to monitor these and other fishery-dependent indicators to determine if current harvest levels are sustainable.

Underwater video surveys of sea cucumber density will be performed again in the summer of 1997 throughout the most important fishing area, the San Juan Islands.