Appendix 2 – Biology data

The figures of this appendix cover nearly all the biological data. The figures are the results of the biological analyses of ICES/IOC workshop samples for the German Bight sampling Stns 1 to 9 and the drilling site transect sampling Stns A to G. Benthic community data are not presented here; raw data for these are available from M. R. Carr (Plymouth Marine Laboratory).

German Bight and drilling site plots are placed adjacent to each other, and use common units of measurement and axis scaling. The plots have been compiled by M. R. Carr (Plymouth Marine Laboratory, UK).

As a result of variance-to-mean relationships in the original data, some values were log_{10} transformed before analysis. The pooled standard deviation from 1-way ANOVA was used to construct 95% confidence intervals; these, and the means, are displayed on the following figures on transformed axes (logs to the base 10). Histogram plots are usually means, except for the cellular pathology plots (d) to (j) which are medians.

All papers cited in the legends are from this MEPS SPECIAL.
Fig. 1. Prevalence rates for (a) lymphocystis and (b) epidermal papilloma, (c) area within MMC occupied by haemosiderin. Units: (a) to (c) percentages. Source: (a), (b) Vetboak et al. (1993), (c) Buck et al. (1993)

Fig. 2. (a), (b) Grossly visible liver tumours; (c) unsaturated neutral lipids in lysosomes; (d) lysosomal membrane stability; (e) ER (DiOC₃(3)); (f) EROD; (g) oxyradicals; (h) fluid phase endocytosis; (i) acridine orange uptake in lysosomes; (j) lysosomal neutral red retention time; (k) lipid vacuolation; (l) altered cell foci. Units: (a) to (c) percentages; (d) minutes; (e) to (i) fluorescence (arbitrary units); (j) minutes; (k), (l) percentages. Source: (a) to (d) Kohler et al. (1993); (e) to (h) Moore (1993); (i), (j) Lowe et al. (1993); (k), (l) Simpson et al. (1993)
**CELLULAR PATHOLOGY**

Fig. 2. (continued). (m) Morphological malformations; (n) anaphase aberrations; (o) chemical/DNA adducts; bacterial mutagen assays for (p) strain TA100 and (q) strain TA98. Units: (m) to (o) percentages; (p), (q) unknown. Source: (m), (n) Cameron et al. (1993); (o) to (q) Chipman et al. (1993)

**BIOCHEMISTRY**

Fig. 3. (a) EROD activity; (b) CN-ECOD activity; (c) P450; (d) P4501A1 mRNA; (e) superoxide dismutase; (f) catalase; (g) putative DT-diaphorase; (h) glutathione peroxidase. Units: (a), (b) nmol min$^{-1}$ mg$^{-1}$ mic. protein; (c) nmol g$^{-1}$ liver; (d) optical absorbance units; (e) units g$^{-1}$ wet wt; (f, h) nmol min$^{-1}$ g$^{-1}$ wet wt; (g) nmol min$^{-1}$ mg$^{-1}$ mic. protein. Source: Renton et al. (1993), Livingstone et al. (1993)
Fig. 3 (continued). (i) to (k) Metal concentrations. (l) metallothionein level; (m), (n) and (p) P4501A1-ELISA in microsomes; (o), (q) P4501A1-ELISA in postmitochondrial supernatants (▲ = juveniles, ■ = mature); (r) EROD in postmitochondrial supernatants; (s) acetylcholinesterase; (t) butyrylcholinesterase. Units: (i) to (l) μg g⁻¹ wet wt; (m) to (q) absorbance units nmol min⁻¹ mg⁻¹ protein; (s), (t) absorbance units mg⁻¹ protein. Source: (i) to (l) Hylland et al. (1993); (m) to (r) Goksøyr et al. (1993); (s), (t) Galgani et al. (1993).
**BIOCHEMISTRY**

![Graphs showing various biochemical parameters for different tissues and conditions.](image)

Fig. 3. (continued) | (u) EROD activity using 12,500 × g supernatant; (v) Mg²⁺-ATPase activity; Na⁺,K⁺-ATPase activity for (w) total tissue; (x) ouabain binding; (y) activity per binding site; (z) P450 1A1 (CYP 1A1) protein levels; (a) to (g) metal concentrations; (δ) metallothionein. Units: (u, v) nmol min⁻¹ mg⁻¹ protein; (w, x) μmol P, mg⁻¹ protein h⁻¹; (y) pmol mg⁻¹ protein; (z) μmol P, h⁻¹ pmol⁻¹ ouabain; (a) relative absorbance units; (g) to (δ) μg mg⁻¹ protein. Source: (u) Eggens et al. (1993); (v) to (δ) Stagg (1993)

**WATER BIOASSAYS**

![Graphs showing bioassay results for different samples and conditions.](image)

Fig. 4. Length of *Tisbe battagliai* for (a) 3 m water sample, (b) drum microlayer sample, (c) screen microlayer sample, (d) sediment elutriate sample (200 ml sediment: 600 ml water). Units: (a) to (c) length as percentage of control; (d) survival as percentage of control. Source: Williams (1993)
Fig. 4. (continued). Development of D-shaped Crassostrea gigas larvae for (e) 3 m water sample, (f) drum microlayer sample, (g) screen microlayer sample, (h) sediment elutrate sample (200 ml sediment : 600 ml water). 5 d growth of Tetraselmis suecica in (i) 3 m water sample and (j) sediment elutrate sample (200 ml sediment : 600 ml water). 5 d growth of Isochrysis galbana in (k) 3 m water sample and (l) sediment elutrate sample (200 ml sediment : 600 ml water); survival of C. gigas larvae following 48 h exposure to (m) 3 m water sample, (n) screen microlayer sample, (o) sediment elutrate sample (200 ml sediment : 600 ml water); survival of Tapes philippinarum larvae following 48 h exposure to (p) 3 m water sample, (q) screen microlayer sample, (r) sediment elutrate sample (200 ml sediment : 600 ml water); relative reproduction rates of Eirene vindula colonies in (s) XAD (F = 600). Units: (e) to (h) percentage of survivors, (i) to (l) cells μl⁻¹, (m) to (r) percentages. Source: (e) to (l) Thain (1993); (m) to (r) McFadzen (1993); (s) to (t) Bening et al. (1993)
SEDIMENT BIOASSAYS

Fig. 5. (a) Survival of Bathyporeia sarsi; (b) reburial of B. sarsi; (c) and (d) survival of Rhepoxynius abronius; (e) reburial of R. abronius; (f) survival of Corophium volutator; (g) survival of Neanthes arenaceodentata; (h) growth of N. arenaceodentata.

Units: (a) to (g) percentages; (h) percentage of control. Source: (a) to (g) van den Hurk et al. (1993); (h) Chapman (1993)
SEDIMENT BIOASSAYS

(i) Survival (%) C. gigas

(j) Survival (%) C. gigas

(k) Survival (nos per ml) C. gigas

(l) Metamorphosis (%) C. gigas

(m) D-shaped larvae (%) C. gigas (10% extract)

(n) D-shaped larvae (%) C. gigas (100% extract)

(o) D-larvae (%) C. gigas

Fig. 5 (continued). (i) to (k) Survival of Crassostrea gigas; (l) metamorphosis of C. gigas; (m) to (o) development of D-shaped C. gigas larvae. Units: (i), (j) percentages, (k) numbers per ml, (l) to (o) percentages. Source: (i) to (o) Butler et al. (1993)