

## 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.

GROSS PATHOLOGY

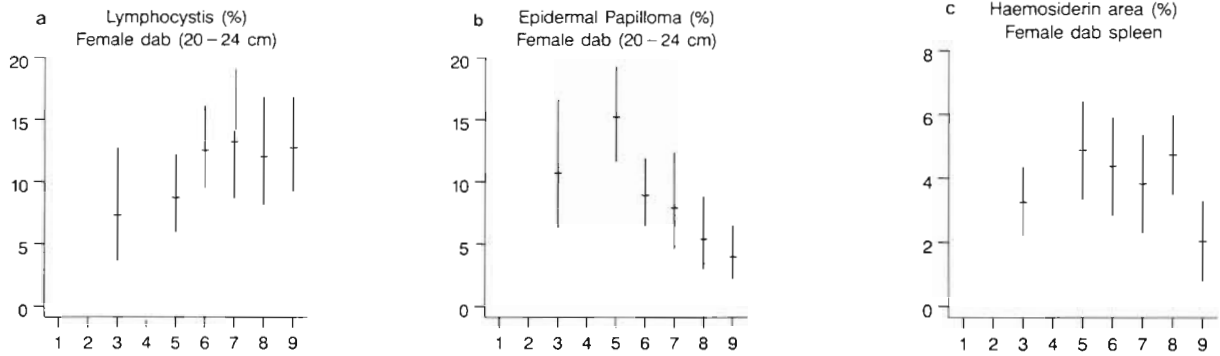


Fig. 1. Prevalence rates for (a) lymphocystis and (b) epidermal papilloma; (c) area within MMC occupied by haemosiderin. Units: (a) to (c) percentages. Source: (a), (b) Vethaak et al. (1993); (c) Bucke et al. (1993)

CELLULAR PATHOLOGY

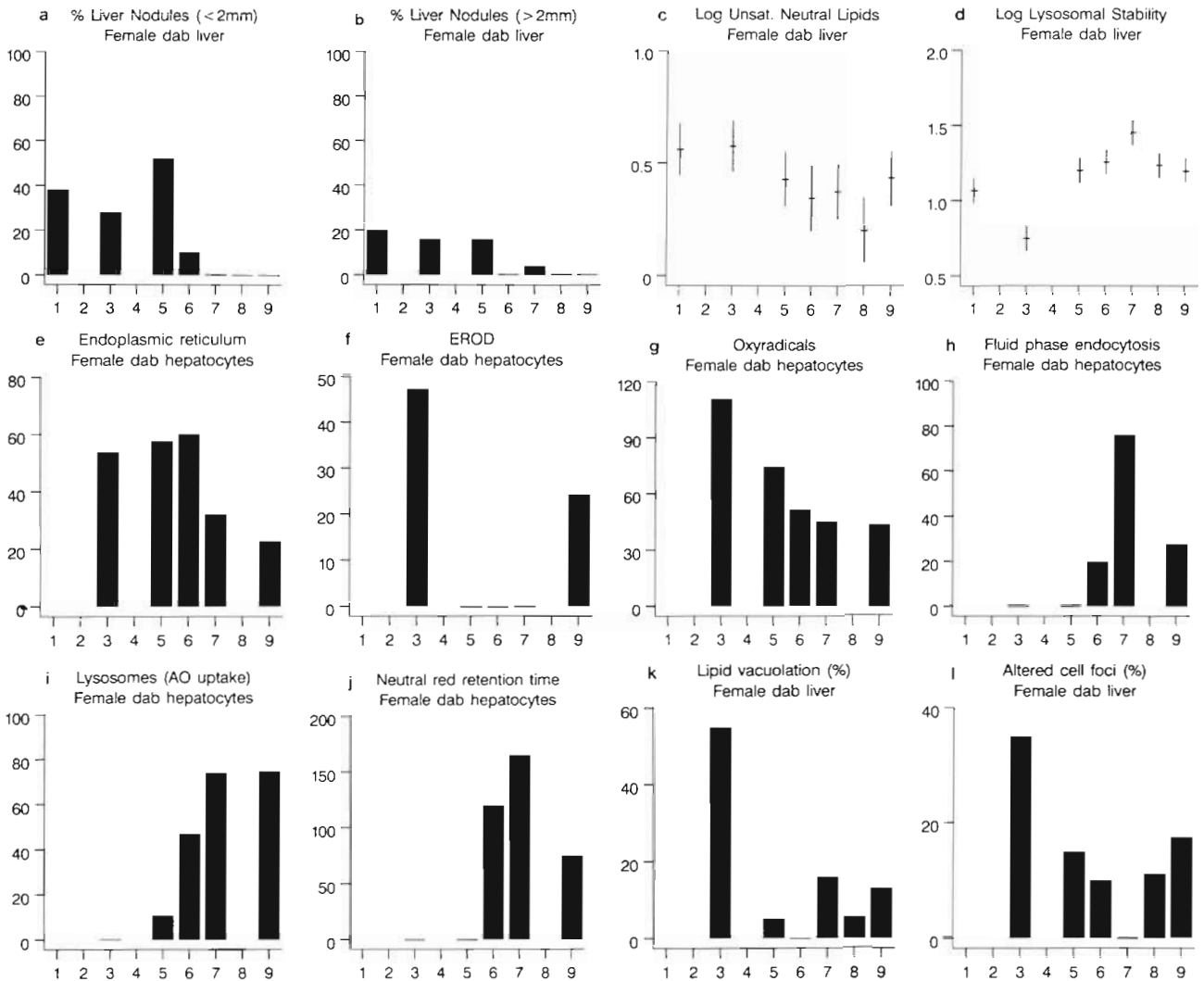


Fig. 2. (a), (b) Grossly visible liver tumours; (c) unsaturated neutral lipids in lysosomes; (d) lysosomal membrane stability; (e) ER (DiOC<sub>6</sub>[3]); (f) EROD; (g) oxyradicals; (h) fluid phase endocytosis; (i) acridine orange uptake in lysosomes; (j) lysosomal neutral red retention time; (k) lipid 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) Köhler et al. (1993); (e) to (h) Moore (1993); (i), (j) Lowe et al. (1993); (k), (l) Simpson et al. (1993)

## CELLULAR PATHOLOGY

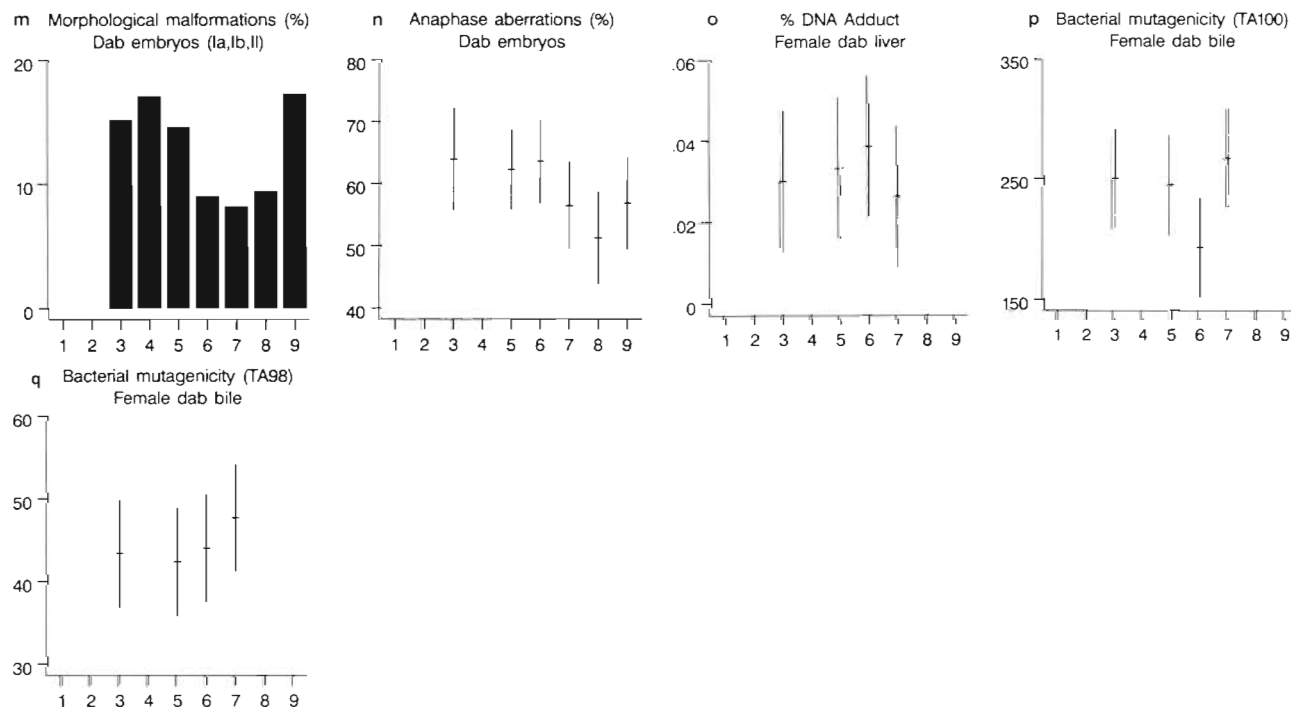


Fig. 2. (continued). (m) Morphological malformations; (n) anaphase aberrations; (o) chemical/DNA adducts; bacterial mutagen assays for (p) strain TA100 and (q) strain TA98. Units: (m) to (o) percentages; (p), (q) unknown. Source: (m), (n) Cameron et al. (1993); (o) to (q) Chipman et al. (1993)

## BIOCHEMISTRY

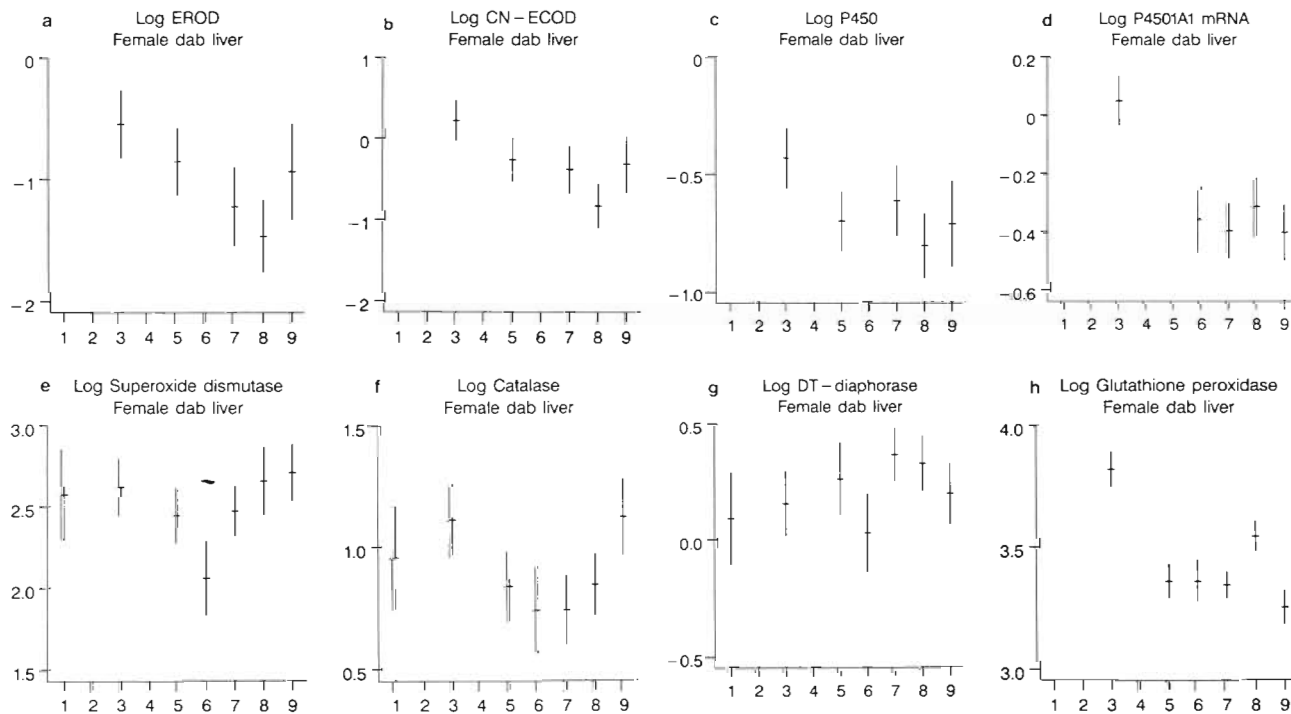


Fig. 3. (a) EROD activity; (b) CN-ECOD activity; (c) P450; (d) P4501A1 mRNA; (e) superoxide dismutase; (f) catalase; (g) putative DT-diaphorase; (h) glutathione peroxidase. Units: (a), (b)  $\text{nmol min}^{-1} \text{mg}^{-1} \text{mic. protein}$ ; (c)  $\text{nmol g}^{-1} \text{liver}$ ; (d) optical absorbance units; (e)  $\text{units g}^{-1} \text{wet wt}$ ; (f, h)  $\text{nmol min}^{-1} \text{g}^{-1} \text{wet wt}$ ; (g)  $\text{nmol min}^{-1} \text{mg}^{-1} \text{mic. protein}$ . Source: Renton et al. (1993), Livingstone et al. (1993)

## BIOCHEMISTRY

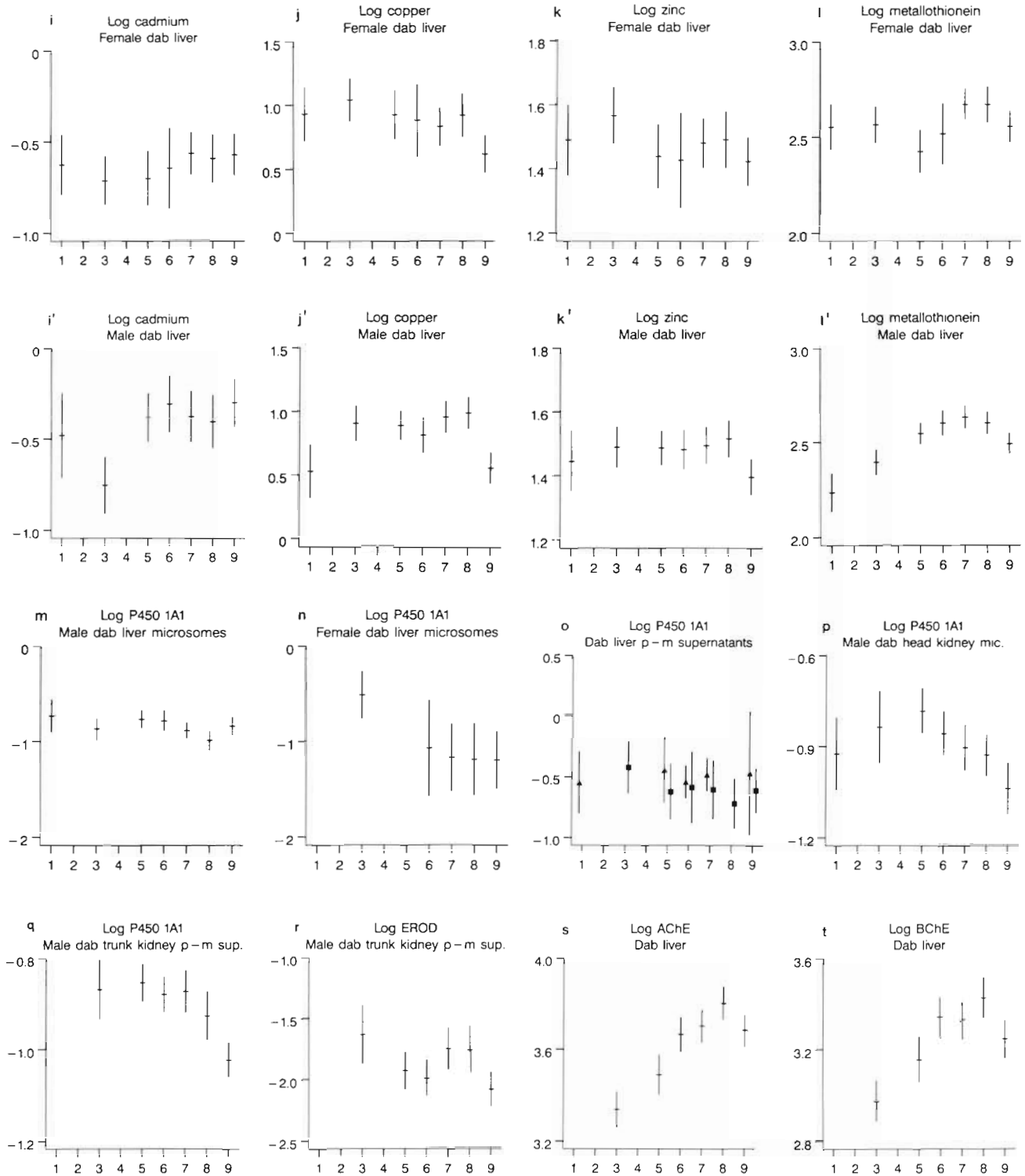


Fig. 3 (continued). (i) to (k) Metal concentrations; (l) metallothionein level; (m), (n) and (p) P4501A1-ELISA in microsomes; (o), (q) P4501A1-ELISA in postmitochondrial supernatants ( $\blacktriangle$  = juveniles,  $\blacksquare$  = mature); (r) EROD in postmitochondrial supernatants; (s) acetylcholinesterase; (t) butyrylcholinesterase. Units: (i) to (l)  $\mu\text{g g}^{-1}$  wet wt; (m) to (q) absorbance units  $\text{nmol min}^{-1} \text{mg}^{-1}$  protein; (s), (t) absorbance units  $\text{mg}^{-1}$  protein. Source: (i) to (l) Hylland et al. (1993); (m) to (r) Goksøyr et al. (1993); (s), (t) Galgani et al. (1993)

## BIOCHEMISTRY

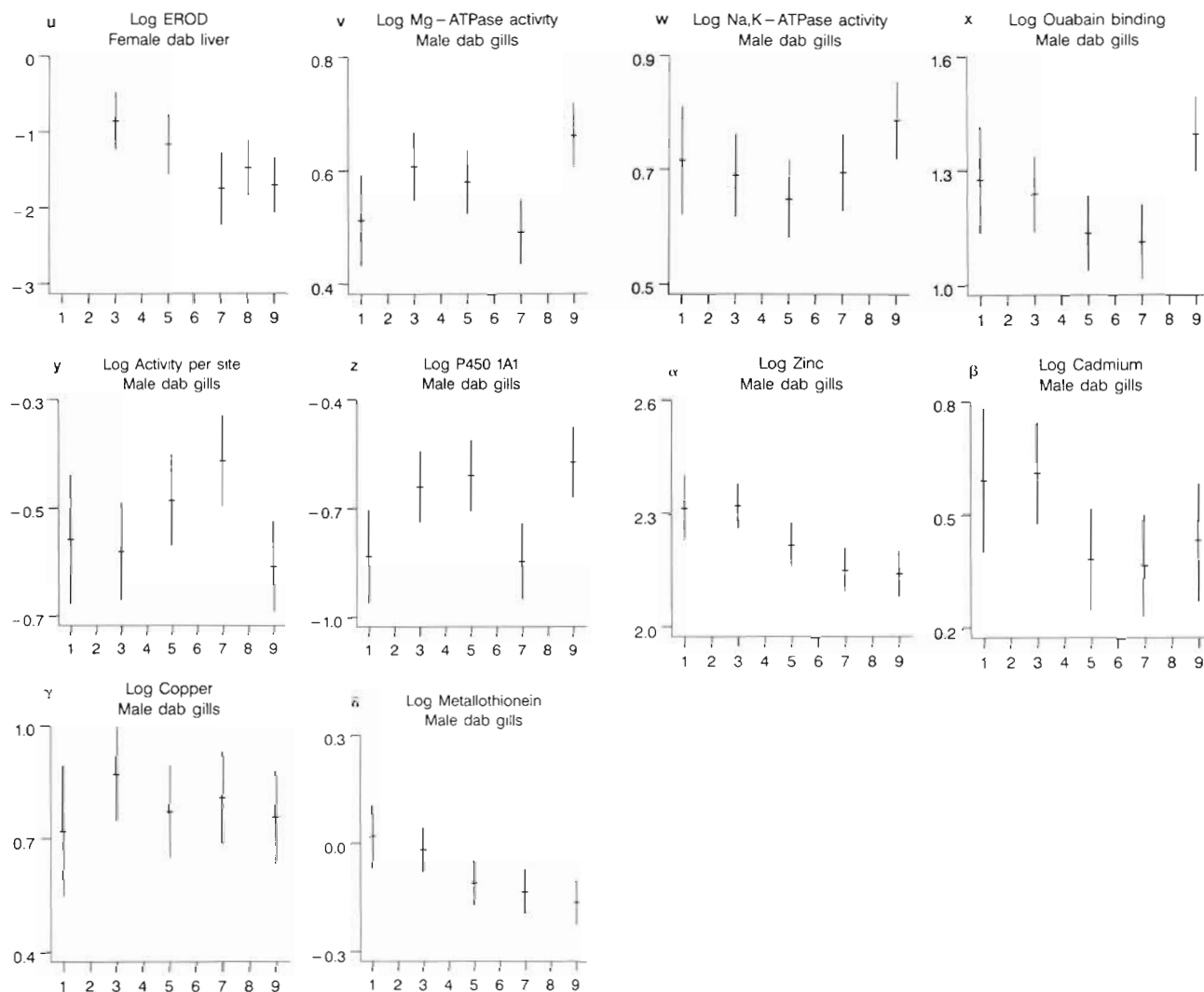


Fig. 3. (continued). (u) EROD activity using  $12\ 500 \times g$  supernatant; (v)  $Mg^{++}$ -ATP-ase activity;  $Na^{+} K^{+}$ -ATP-ase activity for (w) total tissue, (x) ouabain binding, (y) activity per binding site; (z) P450 1A1 (CYP 1A1) protein levels; (α) to (γ) metal concentrations; (δ) metallothionein. Units: (u)  $nmol\ min^{-1}\ mg^{-1}$  protein; (v), (w)  $\mu mol\ P_i\ mg^{-1}\ protein\ h^{-1}$ ; (x)  $pmol\ mg^{-1}$  protein; (y)  $\mu mol\ P_i\ h^{-1}\ pmol^{-1}$  ouabain; (z) relative absorbance units; (α) to (γ)  $ng\ mg^{-1}$  protein; (δ)  $\mu g\ mg^{-1}$  protein. Source: (u) Eggens et al. (1993); (v) to (δ) Stagg (1993)

## WATER BIOASSAYS

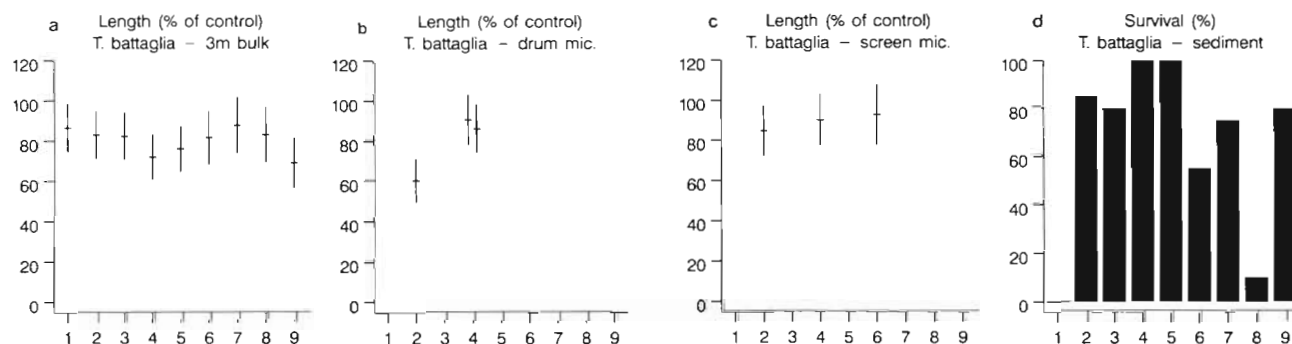


Fig. 4. Length of *Tisbe battagliai* for (a) 3 m water sample, (b) drum microlayer sample, (c) screen microlayer sample, (d) sediment elutriate sample (200 ml sediment: 600 ml water). Units: (a) to (c) length as percentage of control; (d) survival as percentage of control. Source: Williams (1993)

## WATER BIOASSAYS

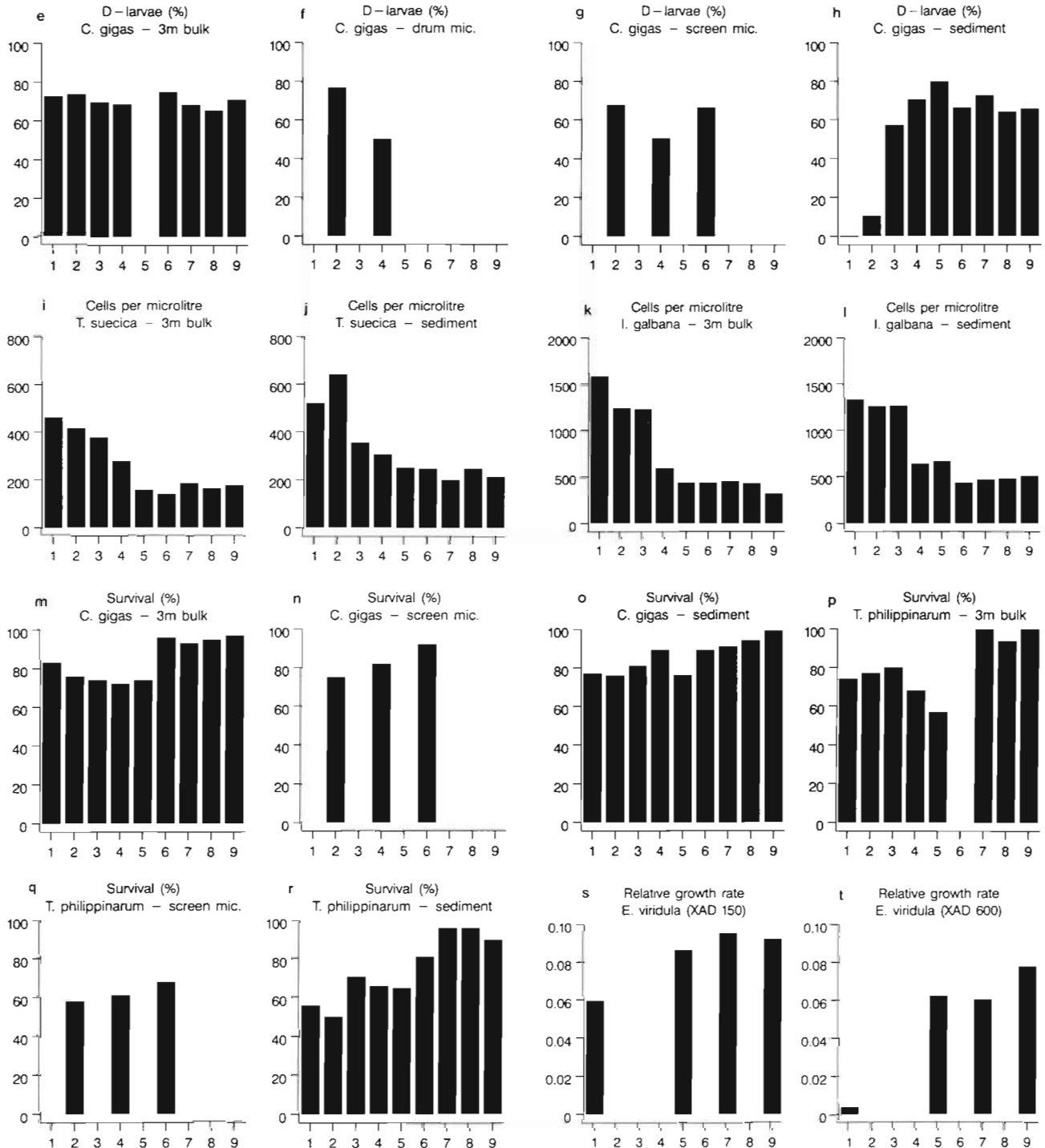


Fig. 4. (continued). Development of D-shaped *Crassostrea gigas* larvae for (e) 3 m water sample, (f) drum microlayer sample, (g) screen microlayer sample, (h) sediment elutriate sample (200 ml sediment : 600 ml water); 5 d growth of *Tetraselmis suecica* in (i) 3 m water sample and (j) sediment elutriate sample (200 ml sediment : 600 ml water); 5 d growth of *Isochrysis galbana* in (k) 3 m water sample and (l) sediment elutriate 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 elutriate 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 elutriate sample (200 ml sediment : 600 ml water); relative reproduction rates of *Eirene viridula* colonies in (s) XAD ( $F = 600$ ). Units: (e) to (h) percentage of survivors; (i) to (l) cells  $\mu\text{l}^{-1}$ ; (m) to (r) percentages. Source: (e) to (l) Thain (1993); (m) to (r) McFadzen (1993); (s) to (t) Bening et al. (1993)

## SEDIMENT BIOASSAYS

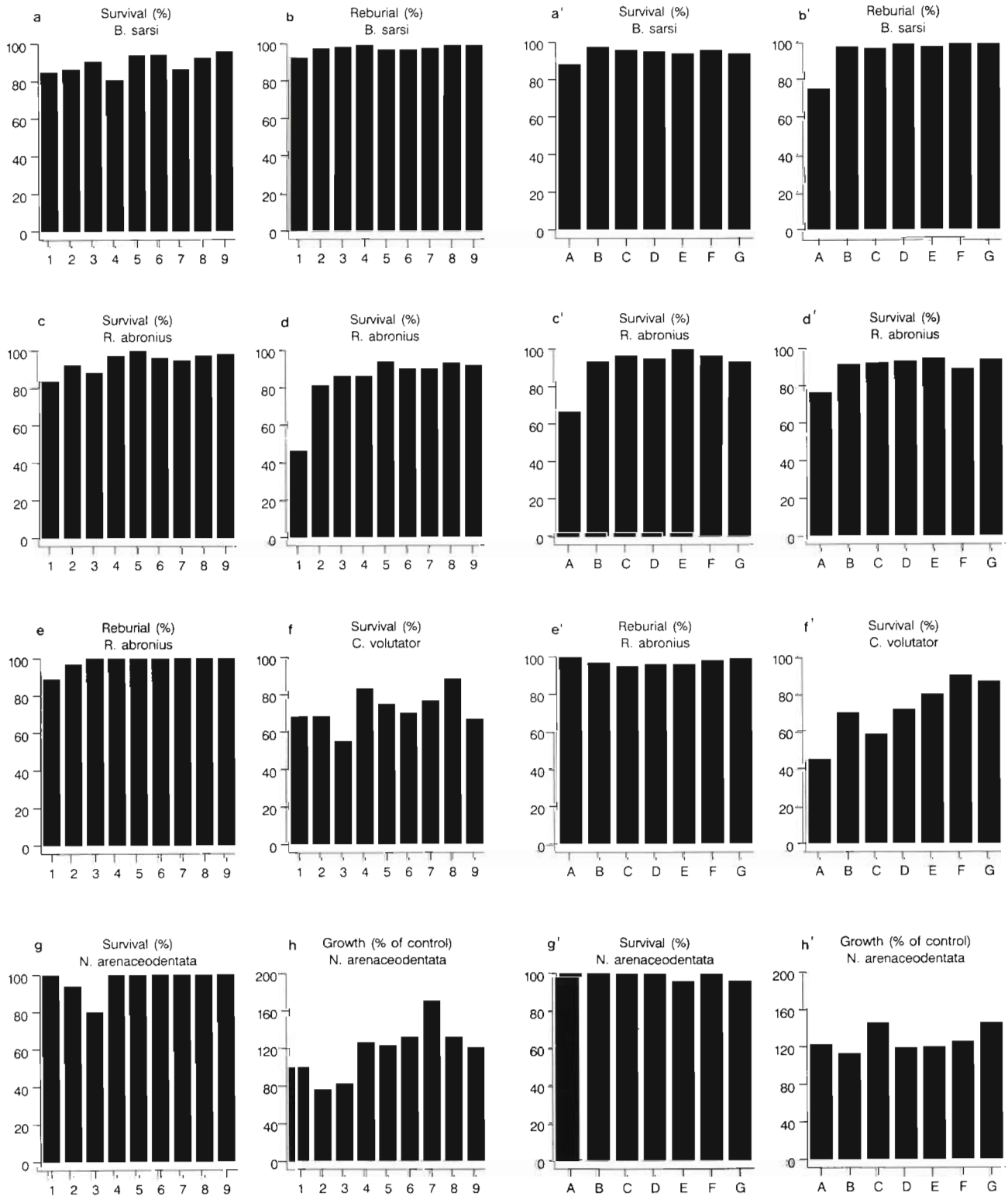


Fig. 5. (a) Survival of *Bathyporeia sarsi*; (b) reburial of *B. sarsi*; (c) and (d) survival of *Rhepoxynius abronius*; (e) reburial of *R. abronius*; (f) survival of *Corophium volutator*; (g) survival of *Neanthes arenaceodentata*; (h) growth of *N. arenaceodentata*. Units: (a) to (g) percentages; (h) percentage of control. Source: (a) to (g) van den Hurk et al. (1993); (h) Chapman (1993)

## SEDIMENT BIOASSAYS

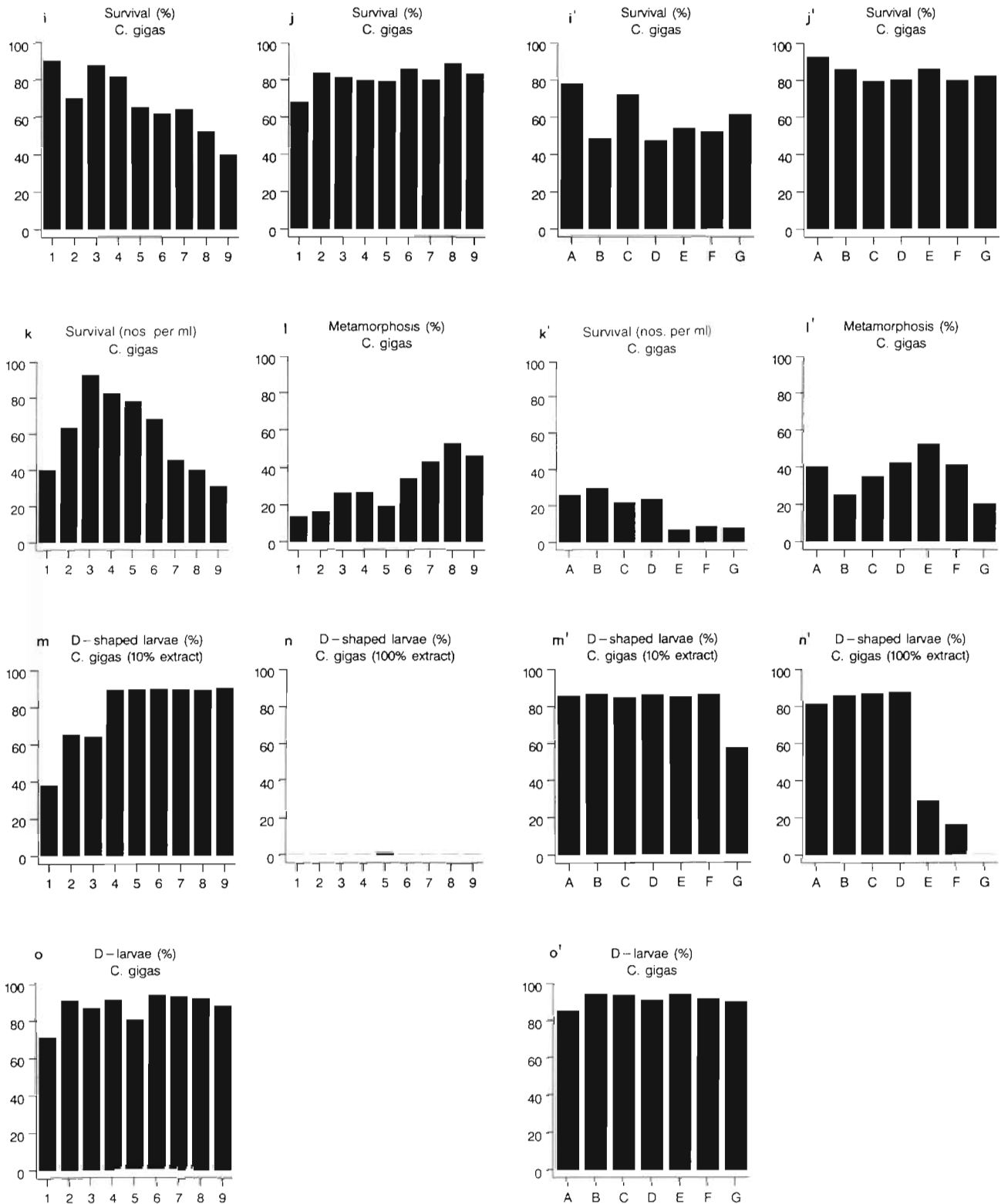


Fig. 5 (continued). (i) to (k) Survival of *Crassostrea gigas*; (l) metamorphosis of *C. gigas*; (m) to (o) development of D-shaped *C. gigas* larvae. Units: (i), (j) percentages; (k) numbers per ml; (l) to (o) percentages. Source: (i) to (o) Butler et al. (1993)