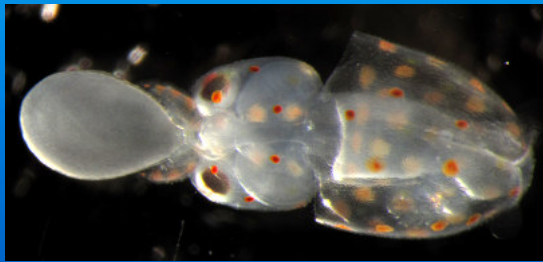


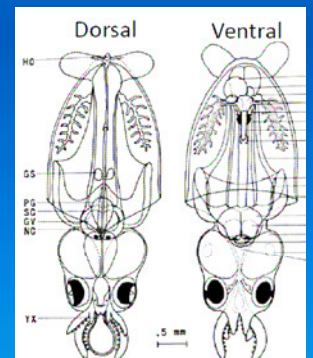
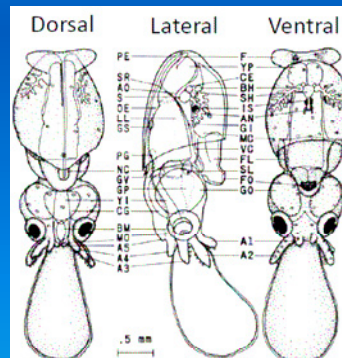
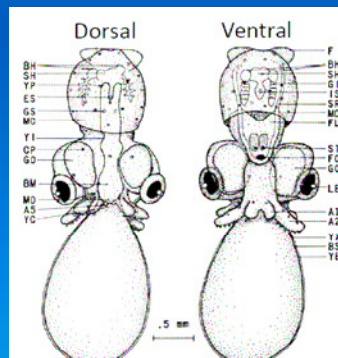
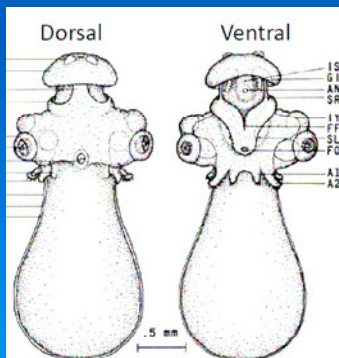
EFFECTS OF LOW pH AND OXYGEN LEVELS ON THE MORPHOLOGY AND DEVELOPMENT OF THE MARKET SQUID, *DORYTEUTHIS OPALESCENS*

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photos of live embryos raised under high pH_{Ox} (left) and low pH_{Ox} (right) conditions



squid embryonic stages 24, 25, 27 and 30 (images from Fields 1965)

- dorsal mantle length increases, while head width and yolk volume both decrease as embryos mature (see embryonic stages above)
- lower pH and oxygen levels (low pH_{Ox}) during development resulted in significant larger yolk volume, shorter dorsal mantle length and wider head width, all indicative of less developed embryos
- embryos raised under low pH_{Ox} conditions thus take longer to develop
- shoaling of oxygen minimal zones on continental shelves and increasing carbon dioxide levels will lead to low pH_{Ox} conditions in wild
- longer development may cause mismatch of newly hatched squid with plankton blooms, with potential sub-lethal effects