

**AN EXPERIMENTAL TEST OF SUBSTRATE-INDUCED STRESS  
IN TWO BENTHIC FISH SPECIES, BURBOT (*LOTA LOTA*)  
AND STONE LOACH (*BARBATULA BARBATULA*)**

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**EXTENDED ABSTRACT ONLY – DO NOT CITE**

Behavioural and respiratory responses of burbot (*Lota lota*) and stone loach (*Barbatula barbatula*) to different types of substrate were tested. Both species showed distinct diel cycles in activity and respiration rate with highest values immediately after dusk and lowest values during the day. In burbot, a 30% increase in mean respiration rate was observed on pebble substrates compared to cobbles in a 24-h cycle. During daytime, these effects increased to 86%, indicating a high level of substrate induced stress in juvenile burbot when no adequate shelter is available. In contrast, no significant differences in respiration rate between substrates were found during the night. The results show that the lack of adequate shelter may substantially affect metabolism and somatic growth rates in benthic fish species. These effects occur when no predator is actually present and shelter is not essential for survival. The results provide evidence that current theories on the effects of substrate and predation pressure should be carefully applied to the benthic community. Because most of these theories are derived from epi-benthic or pelagic 'model' - species, where the actual presence of a threat is needed to modify behaviour and finally specimen's metabolism, their validity for the benthic community seems to be limited. Especially for fish with high substrate affinity, the availability of adequate shelter may be of more importance than other environmental resources, even when no predator is actually present.



