

Effects of dams on oviposition habitat and egg supply of caddisflies in the Murrumbidgee Irrigation Area (#160)

Handoko Wahjudi ¹, Barbara J. Downes ¹, William D. Bovill ¹, Andrew Brooks ²

1. The University of Melbourne, Melbourne, VIC, Australia
2. DPIE - Water, Wollongong, NSW, Australia

Understanding the processes that limit population size is challenging for species with complex life cycles. It is often unclear where within their life history these controls are set, and controls at the egg life cycle stage may limit abundance of later stages. Many stream insects rely on hard substrates (e.g. partially submerged rocks) as oviposition sites to lay their eggs. In regulated rivers, altered flows below dams may reduce spatio-temporal availability of oviposition habitat, potentially limiting egg supply and subsequent recruitment. These effects have not been tested.

Using surveys and experiments in the Murrumbidgee Catchment, NSW, we compared the effects of habitat limitation on egg supply in channels with natural vs. regulated flow regimes across Tumut River (n=3, downstream of Blowering dam, Snowy Mountain Scheme), Murrumbidgee River (n=3, downstream of Burrinjuck dam), and their unregulated tributaries (n=8).

Compared to unregulated rivers, high irrigation flows in regulated rivers significantly reduced abundance of oviposition habitat during spring and summer. Positive relations between densities of oviposition habitat and egg masses for some species in the Murrumbidgee Catchment suggest that dams may limit egg supply in regulated rivers. Surprisingly, egg supply in unregulated rivers was also low in summer due to thick accumulations of algae that encrusted otherwise suitable rocks and precluded oviposition. Accumulation of algae was attributed to low summer flows. During experiments, removing algae from some rocks resulted in eggs being laid exclusively on those cleaned rocks, indicating that algal crusts are a barrier to recruitment in unregulated streams.

Summer is a peak oviposition period for many aquatic invertebrates, but we observed widespread recruitment failure of caddisfly populations due to submergence of oviposition habitat in regulated rivers, and accumulation of encrusting algae in unregulated rivers. This indicates that dams may contribute to recruitment failure in stream fauna at multiple spatio-temporal scales.

-
-
-



Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:

Wahjudi, H; Downes, B; Bovill, W; Brooks, A

Title:

Effects of dams on oviposition habitat and egg supply of caddisflies in the Murrumbidgee Irrigation Area

Date:

2019

Citation:

Wahjudi, H., Downes, B., Bovill, W. & Brooks, A. (2019). Effects of dams on oviposition habitat and egg supply of caddisflies in the Murrumbidgee Irrigation Area

Persistent Link:

<http://hdl.handle.net/11343/234143>

File Description:

Accepted version