

Testing and developing tools for weed macrophyte control in Canterbury agricultural waterways

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Aquatic macrophytes provide important functions in stream ecosystems, however, excessive macrophyte growth in agricultural landscapes can have negative impacts including accumulating sediment and causing flooding. When agricultural waterways become choked during summer, management typically involves mechanical clearance using a bank-side digger. This practice can over steepen banks, damage in-stream habitat and hinder aquatic ecosystem function. As part of the Canterbury Waterway Rehabilitation Experiment (CAREX), we tested macrophyte control methods at a small-scale, testing: hand weeding, herbicide spray, weed mat, channel shading, flower and seed removal, sediment removal and physical disturbance. Hand weeding, weed mat and herbicide spray provided effective reductions in macrophyte growth. Macrophyte growth was severely limited under full shade across the channel (with 70% light reduction), however growth was enhanced in partially shaded channels. To identify the optimum level of shading required to control excessive plant growth, we tested shading across a gradient using 25 five-metre shade tunnels. Additionally, to test the practicality of hand weeding and weed mat at a real-world scale, we have expanded these treatments to larger-scale, ongoing, field trials. Overall, our results reveal ecologically sound solutions to global weed macrophyte problems are likely to involve combinations of tools, but will ultimately need to include optimal levels of shade.