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PHYSICAL DISTURBANCE OF *POTAMOGETON TRICARINATUS* AND SEDIMENT BY CARP *(CYPRINUS CARPIO)* IN EXPERIMENTAL PONDS

by

JODY SWIREPIK, B. App. Sc. (Hons)

Cooperative Research Centre for Freshwater Ecology and

Applied Ecology Research Group

University of Canberra

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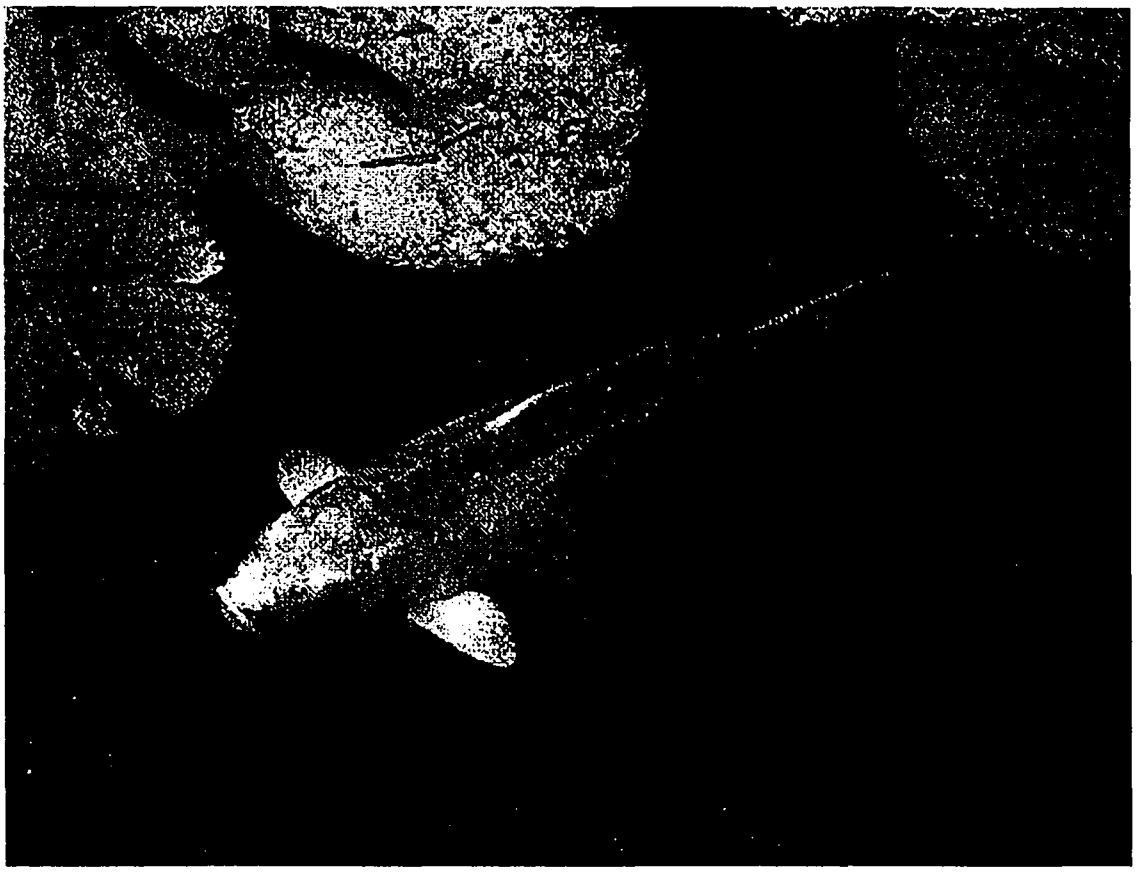

Koi carp and waterlilly in a temple pond at the Heian Shrine, Kyoto Japan.

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Abstract

The impact of carp on a rhizomatous macrophyte was examined in two consecutive years using three outdoor aquaculture ponds with naturally established beds of *Potamogeton tricarinatus.* Each pond was divided with wire fencing to form a carp (500 kg ha^{-1}) and control treatment. After 6 weeks, plant biomass had declined to the same extent in the carp and control treatments, indicating that direct physical disturbance by carp was not reducing the biomass of P. *tricarinatus.* In a second experiment, carp were added to two of the same ponds when plants were regenerating after a 9-11 month drying period. After 8 weeks, *P. tricarinatus* biomass in the carp treatments was between one half and one tenth of the biomass in the control treatments and one control treatment supported more *Najas tenuifolia* than the paired carp treatment. The lower biomass of *Potamogeton* in the carp treatments was a result of fewer shoots and less growth per shoot. Rhizomes had been undermined in the carp treatment with less than 1% of plants growing from rhizome compared to 36% in the control treatment. Accumulation of sediment into traps was significantly higher in the carp treatments (2.5 to 77.5 times more than the control). On average, carp resuspended 662 kg dry sediment ha^{-1} for each 100 kg ha^{-1} of carp or 6.6 times their wet weight biomass in dry sediments each day. Some implications of high sediment resuspension are discussed. The research demonstrates that well anchored macrophyte species can show tolerance to the physical disturbance associated with carp benthic feeding, however, these same species are vulnerable during regenerating and recruitment stages. It is suggested that anchorage is the most important factor for determining plant tolerance to carp. The implications for aquatic plant and riverine management are discussed, including the importance of excluding carp from newly flooded wetlands and the role of carp in determining alternative stable states.

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