The southern ladybird (*Cleobora mellyi*) as a new species association biocontrol agent of tomato-potato psyllid (*Bactericera cockerelli*)

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Since its discovery in New Zealand in 2006, the tomato-potato psyllid (*Bactericera cockerelli*) (TPP) has emerged as a major pest of solanaceous crops. In potato crops, the management of TPP has predominantly relied on insecticide applications, as biological control by generalist predators has been constrained by both insecticide use, and temporal and spatial scales. This research sought to further investigate a generalist predator already established in New Zealand, the southern ladybird (*Cleobora mellyi*), introduced from Tasmania as a biocontrol agent for *Paropsis charybdis* in the 1970s and 1980s, as a potential biocontrol agent of TPP. The southern ladybird's prey selection, ladybird longevity and ladybird-TPP predator-prey dynamics were investigated. A choice test assay utilised small experimental arenas of three alternative choices between: (1) TPP and green peach aphid, *Myzus persicae*, (2) TPP and potato aphid, *Macrosiphum euphorbiae* and (3) TPP and greenhouse whitefly, *Trialeurodes vaporariorum*. *Cleobora mellyi* larvae and adults did not demonstrate a significant prey preference between TPP and either green peach aphid or potato aphid, but did show a significant aversion to greenhouse whitefly. Longevity trials consisted of a water only control and three treatments: (1) a floral resource (flowering buckwheat), (2) 10 TPP/day or (3) flowering buckwheat + 10 TPP/day. All three treatments lived significantly longer than the water only control, and southern ladybirds adults lived significantly longer when given both the floral resource and TPP compared to only being given TPP. A glasshouse mesocosm study was used to investigate ladybird-TPP predator-prey dynamics. Within 3 weeks the southern ladybird had significantly reduced TPP densities in the treatment in which they were present along with potato plants and TPP compared to the treatment without ladybirds, a reduction that was maintained until the completion of the experiment. Where there was only TPP and no ladybird, no potato tubers were formed; in the presence of southern ladybird small and few potato tubers were formed, while, the most tubers were produced in insect-free controls. This indicates a species-level trophic cascade. This study has shown that the southern ladybird is capable of predating upon TPP and reducing densities within the controlled conditions of a glasshouse. However, with the current state of knowledge, the southern ladybird is not likely to be a viable predator for controlling TPP in potato crops outside glasshouses in New Zealand. This is due in part to the freedom to disperse in the field, the economics of such large scale rearing, and fundamental differences in habitat type compared to their natural environment, but applications in alternative contexts cannot be ruled out.