

Impact of climate change on biological control in New Zealand

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By 2090, New Zealand's climate is predicted to average around 2°C warmer than in 1990. Rainfall is expected to increase in the west and decline in the east, and extreme weather events will increase in frequency. Some cropping systems will move southward and their biocontrol systems will move with them, with little change in composition and impact. But others will face challenges. Case studies of five biocontrol systems showed: 1) Ragwort suppression by ragwort flea beetle will be less in areas of western regions, but larger areas in northern North Island will attain suppression; 2) The viability of current IPM systems to control tomato fruitworm over much of the North Island may be compromised; 3) The overall effectiveness of the woolly apple aphid IPM programme is predicted to be maintained, but with increasing importance of an insecticide application in spring; 4) The current success of lucerne weevil biocontrol may be compromised as New Zealand's climate approaches that of South Australia, where the biocontrol agent is ineffective; 5) Continuing biocontrol suppression of the Argentine stem weevil may rely on local adaptation of its parasitoid which exhibits some genetic variation. New Zealand can ensure biocontrol continues as a mainstream pest management tool by identifying and addressing risks in existing IPM systems, providing refuge habitats, taking pre-emptive action against "sleeper pests", introducing new genetic lines for biocontrol agents founded by few individuals, and maintaining border biosecurity and surveillance to defend against the increased risk that the frequent subtropical "door knockers" become permanently established.

