

Home and away: long-term wasp population dynamics are similar in native and invaded ranges, with spring weather a key influence on numbers

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Introduced species often experience different population dynamics in their introduced and native ranges. We examined the long-term population dynamics of the invasive common wasp, *Vespula vulgaris*, in its native (English) range and its invaded range in New Zealand. Wasp population time series were examined using partial rate correlation functions. Gompertz population regression models and multivariate autoregressive state-space (MARSS) models were fitted, both incorporating climatic variation. Density dependence in wasp populations was similar in both countries, with previous-year wasp abundance the most important variable in predicting intrinsic rate of increase. No evidence of cyclic population dynamics was observed. Both Gompertz and MARSS models highlighted the role of weather conditions in each country as significant predictors of annual wasp numbers. The temporal evolution of wasp populations at all sites was best modelled jointly using a single latent dynamic factor for local trends, with the inclusion of a latent spring weather covariate. That same parsimonious multivariate model structure was optimal in both the native and invaded ranges. Spring weather in both countries has a major influence on wasp numbers, probably through impact on wasp colony initiation and early development. Invasive species may not exhibit different population dynamics, despite considerable variation in abundance throughout their distribution. **Keywords:** density dependence, invasive species, multivariate time series analysis, partial rate correlation functions, population dynamics

