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Szabo, Judit, Davy, P., Astheimer, L. B. and Hooper, M. J. 2006, Predicting avian species distributions to evaluate the spatio-temporal overlap with locust control operations in Eastern Australia using generalised linear models, in ANCAP - SETAC 2006 : International Conference on Pesticide Use in Developing Countries : Environmental fate, effects and public health implications, [ANCAP - SETAC], [Arusha, Tanzania].

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ABSTRACT
Since European occupation of Australia, locusts and grasshoppers have been causing economic damage and thus, various control measures have been implemented against them. At present, three different pesticides, fenitrothion, an organophosphate, fipronil, a phenyl pyrazole, and Metarhizium, an entomopathogenic fungus, are applied in eastern Australia by The Australian Plague Locust Commission. Exposure of birds to agricultural pesticides is of concern worldwide, especially in the case of rare and endangered species. The aim of this study was to evaluate the potential risk of exposure of 285 avian species to operationally applied locust-control pesticides. Using presence-absence data provided from the Birds Australia Atlas for eastern Australia between 1998 and 2002, we developed a series of generalised linear models to predict avian occurrences on a monthly basis in half-degree grid cells. Models were species-specific, including the time and location of observations, rainfall and the derived habitat-preference of the particular species. The complexity of the model depended on the number of observations for the species. The models were evaluated using data collected in nine fieldtrips between 2000 and 2005. From the models, we calculated the probability of 285 avian species being present at times and locations of locust control operations. A high number of bird species were predicted to be present at high probabilities at times and locations of control operations. Field surveys of avian species occurrence and behavior during locust outbreaks demonstrated the strength of the derived species lists, identified unanticipated species and emphasized the need for special considerations for rare and endangered species.

Keywords locust-control pesticides; Australia; Generalised Linear Models; birds