

El Niño events, precipitation patterns, and rodent outbreaks are statistically associated in semiarid Chile

Mauricio Lima, Pablo A. Marquet, Fabian M. Jaksic

Abstract

In the last two decades, several researchers have noted rodent population outbreaks in semiarid South America, in association with unusually high precipitation that seemingly concurs with El Niño events. To date, no studies have been conducted to determine the statistical relationships between ENSO (El Niño Southern Oscillation) events, increased precipitation, and rodent irruptions. Here we show that: 1) there is a statistical association between ENSO events and increased precipitation in the semiarid region of northern Chile: 2) the occurrence of rodent outbreaks in that region is statistically related with the precipitation levels of the same year: 3) the multi-annual patterns of the total annual precipitation levels and population abundance of those rodents during the summer are positively associated. The putative chain of effects seems to start with unusually high rainfall brought by ENSO to semiarid environments, which thus respond with increased primary productivity (herbage and seeds), which then fuels the rodent outbreaks.