Abstract

There is compelling evidence that numbers of eastern North American monarchs are declining, as documented by the area they occupy in their Mexican overwintering grounds. Decreasing availability of breeding habitat has been implicated in this decline. However, it is difficult to document population size during the breeding phase of the annual cycle because monarchs are dispersed over a large area, and eggs and larvae are only monitored in remaining milkweed patches. We assess monarch egg densities on a per host plant basis from 1997 to 2014, using data from the Monarch Larva Monitoring Project (MLMP), a citizen science program. We analyzed the effects of habitat characteristics and overall trends in monarch egg densities within and between years. Gardens and sites with fewer milkweed plants tended to have higher egg densities, and natural areas tended to have lower densities. While there was a great deal of year-to-year variation in monarch egg densities, MLMP data document declining densities after 2006. Finally, breeding area egg density is a significant positive predictor of the area occupied in the Mexican overwintering grounds. Additionally, the area planted in herbicide-tolerant crops is a significant negative predictor of the area occupied in the Mexican overwintering grounds. Our findings suggest that monarchs are not compensating for the loss of breeding habitat by laying more eggs in the remaining habitat. We conclude that declining egg densities over the past eight years could indicate a lack of critical mass needed to ensure that monarchs find remaining habitat.

The full publication can be accessed at this link: http://aesa.oxfordjournals.org/content/108/5/670