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The effect of interspecific competition between *Culex pipiens* and *Aedes albopictus* in northern Italy

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Aedes albopictus and *Culex pipiens* larvae reared in the same breeding site compete for resources, with an asymmetrical outcome that disadvantages only the latter species. The impact of these interactions on the overall ecology of these two mosquito species has not yet been assessed in the natural environment. In the present study, the temporal patterns of adult female mosquitoes from both species were analyzed in northeastern Italy, and substantial temporal shifts between abundance curves of *Cx. pipiens* and *Ae. albopictus* were observed in several sites. To identify the drivers of such differences, we developed a density-dependent mechanistic model that takes explicitly into account the effect of temperature on the development and survival of both species. In addition, we included into the model the effect of asymmetric interspecific competition, by adding a mortality term for *Cx. pipiens* larvae proportional to the larval abundance of *Ae. albopictus.* A model calibration was performed through a Monte Carlo Markov chain approach using capture data collected in our study sites in 2014 and 2015. In several cases, our results show that an increasing in abundance of *Ae. albopictus* caused an early decline of *Cx. pipiens* population and that the competition effect was enhanced by higher abundance of either species. However, in some cases temporal shifts can also be explained in the absence of interspecific competition resulting from a 'temporal niche' effect, when the optimal fitness environmental conditions for the two species are reached at different times of the year. These findings demonstrate the importance of taking into account ecological interactions between mosquito species in temperate climates, with important implications for the invasion dynamics of the alien species and for risk assessment of mosquito transmitted pathogens.