Tracing a Fast European Invasion: The Case of the Western Conifer Seed Bug (Leptoglossus occidentalis)

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The Western conifer seed bug, *Leptoglossus occidentalis* Heidemann (Heteroptera, Coreidae), is considered as a major pest of cones and seeds in conifer seed orchards of its native western North American range. It was unintentionally introduced in the Eastern part of the USA during the 1950s and then spread eastwards to reach the Atlantic coast in the 1990s. Then, it was introduced in Europe during the late 1990s and first reported in Italy in 1999. The bug expanded its range very quickly and colonized most of Europe within just a decade. Recent studies indicated that it can be considered as a serious threat for seed production not only in seed orchards but also in natural stands.
In order to implement successful management program and understand the reasons underlying the invasive success of *L. occidentalis* in Europe, it is important to characterize the routes of its fast expansion, assessing if it has proceeded from a unique or several different introductions. We used mitochondrial gene sequence data and a set of microsatellites loci on bugs sampled across the three main areas, i.e. western North America, eastern North America and Europe. Both markers indicate that *L. occidentalis* presents a largely homogeneous population through its entire native area. The invasive samples (European and eastern North American ones) compared to the native ones showed a lower genetic diversity, traducing a bottleneck often characteristic of invasive populations. Moreover, all analyses showed a stronger genetic affinity of European invasive samples with the eastern North American populations than with those of native range. That demonstrates that European populations share a common origin with eastern North America. This suggests that the populations having invaded eastern North America may have acted as a bridgehead for the European invasion. Moreover, as suggested by the historical and biological data, the molecular data confirmed multiple introductions in different parts of Europe.

Keywords: Western conifer seed bug, microsatellite, mitochondrial DNA, multiple introductions, source population