Distribution and abundance of *Culicoides imicola*, Obsoletus Complex and Pulicaris Complex (Diptera: Ceratopogonidae) in Italy

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Summary

Between 2000 and 2003, thousands of light-trap collections for Culicoides were made throughout Italy and a detailed distribution map of the primary vector of bluetongue (BT) virus (BTV), *C. imicola* compiled. In some areas, however, where clinical BT occurred and *C. imicola* could not be captured, the virus was isolated from biting midges belonging to the Obsoletus and/or the Pulicaris Complexes. Thus, the distribution and abundance of these two species complexes in Italy, as determined from about 3 000 collections, are reported here also and compared to that of *C. imicola* (from about 24 000 collections). The probable spread of the main vector of BT, *C. imicola*, into the northern third of Italy, and the widespread prevalence of additional vectors of the Obsoletus and Pulicaris Complexes, indicate nearly all regions of Italy to be at some risk to incursions of BTV. However, these complexes comprise at least six and twelve species, respectively, so precisely which species are able to transmit BTV remains incompletely known.

Keywords

Bluetongue – *Culicoides imicola* – Italy – Obsoletus Complex – Pulicaris Complex.

Introduction

Since 2000, when bluetongue (BT) first affected Italy, thousands of light-trap collections have been made for *Culicoides* throughout the country, and detailed distribution maps for *C. imicola* Kieffer, 1913 compiled (3). During 2000 and 2001 the disease occurred in all regions where this vector was detected, even in those areas where it was found to be extremely rare (2, 3). However, in 2002, no specimens of *C. imicola* could be captured in some areas of Italy where clinical bluetongue (and fatalities) occurred amongst sheep. In three of these outbreaks, BT virus (BTV) serotype 2 and/or BTV serotype 9 were successfully isolated from biting midges of the Obsoletus Complex (7); BTV-2 was isolated also from a species of the Pulicaris Complex on the island of Sicily (1). In this study, the authors report on the distribution and abundance of *C. imicola*, and of the Obsoletus and the Pulicaris Complexes across Italy.

Materials and methods

The collection and the identification of *C. imicola* and species of the Obsoletus and Pulicaris Complexes were performed in accordance with the protocols developed by the National Reference Centre for Exotic Diseases (CESME: Centro Studi Malattie Esotiche) (4). The latter two species complexes comprise at least six and twelve species, respectively; these constituent species could not be identified to the species level, and therefore the distribution of individual species could not be determined. A more complete discussion of the taxonomy of these two species complexes is given elsewhere (6). The map for *C. imicola*, the only species of the Imicola Complex to occur in the Mediterranean Basin, was compiled from almost 24 000 light-trap collections made over the last four years in 1 533 municipalities. The distribution maps for the Obsoletus and the Pulicaris Complexes were compiled from approximately 3 000 collections made in 2001-2002 (629 municipalities sampled).
**Results**

The distributions and abundances of the Obsoletus and Pulicaris Complexes are shown in Figures 1 and 2, respectively; those for *C. imicola* are shown in Figure 3. These Figures show the log abundances of the largest light-trap collection/municipality and are colour-coded to aid visual interpretation of the maps. These abundances are also graphically depicted (in two forms) in Figure 4, but in this instance the data are combined to produce a single figure/region. All 20 regions of Italy were sampled; these are ranked from north to south (roughly) with the islands of Sicily and Sardinia ranked last.

**Discussion**

The absence of historical data on the presence of *C. imicola* in Italy before 2000 does not allow us to establish whether this vector is a recent invader or not (3). Continuous and thorough monitoring across all seasons in all regions has revealed that *C. imicola* occurs beyond the 44th parallel, but at this northern end of its range only one or two specimens are collected at any one site/season (Fig. 3). Continued monitoring of such sites is required to establish whether *C. imicola* is spreading northwards and whether it is increasing in abundance.
Epidemiology and vectors

Figure 3
Maximum light-trap abundances of Culicoides imicola; collections from 1,533 municipalities in all regions of Italy (2000-2003) and seasonal abundances of total Culicoides in the two northernmost collection sites where C. imicola was found in the Provinces of Genoa (A) and Parma (B).

Figure 4
Maximum light-trap abundances of each of the species of Culicoides imicola, Obsoletus Complex and Pulicaris Complex captured in the various regions of Italy. Log numbers represented as a bar graph (A) and a linear graph (B) ranked roughly from north to south. Multiple species comprise the Obsoletus and Pulicaris Complexes, each complex mapped from about 3,000 collections (2000-2002); C. imicola is mapped from about 24,000 catches (2000-2003).
References


