Bees, honey, larvae and pollen in biomonitoring of atmospheric pollution

VINCENZO BALESTRA, GIORGIO CELLI, CLAUDIO PORRINI

SUMMARY. The value relations of lead, chromium, nickel and cadmium as detected by automatic monitoring devices and recoderd by chemical analysis from monthly samples of the honey, pollen and larvae of honey bees are reported and discussed. The experiment was conducted at Modena in 1989 using five monitoring stations deployed around the city, each consisting of two hives. No positive correlation between the values for the biological matrices and for the abiological data was found, although there appears to be a certain latency of the pollutant in the former as compared to the latter. In most cases the plotted trends of the data, especially for lead in honey, are overlapping.

Key words: cadmium, chrome, honey bees, lead, nikel, pollution.

Vincenzo Balestra, Istituto di Statistica Medica e Biometria, University of Genova, Via A. Pastore 1, I-16132 Genova, Italy.

Giorgio Celli, Claudio Porrini, Istituto di Entomologia «Guido Grandi», University of Bologna, Via Filippo Re 6, I-40126 Bologna, Italy.

INTRODUCTION

The biggest problem of the large metropolis is also precisely what makes it a city-very high population density within relatively small confines. Having arisen for reasons of defense, the city has developed in the course of time into an important economic and trade centre, taking on despite itself a strategic role in terms of logistics. By the end of the last century the emergent forces shaping the destinies of the great metropolitan areas like London and Paris had even dictated the construction of underground systems of mass transport.

By contrast, the cities of Italy, which had developed around an historical core that was anything but amenable to motor traffic, suffered, so to speak, at the hands of economic development. *Vehicular traffic is today the leading cause of degradation in the nation's cities.* Currently, the monitoring of pollutants in the urban environment is more and more the task of expensive automatic networks, although several biological indicators are also being studied and, in some cases, even implemented.

The bee is one of these bioindicators. A number of researchers (Accorti and Persano Oddo, 1986; Celli *et al.*, 1987; Stein and Umland,