

# Airborne algae and lichen soredia in Mérida (Badajoz, SW Spain)

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## Introduction

Algae are present everywhere and some of them use air as dispersion media. Although some airborne algae induce allergy or other respiratory problems their major concern is contamination of water tanks as well as attack over surfaces of buildings or outdoor stone arts, acting as biodeterioration agents (Fig. 1).

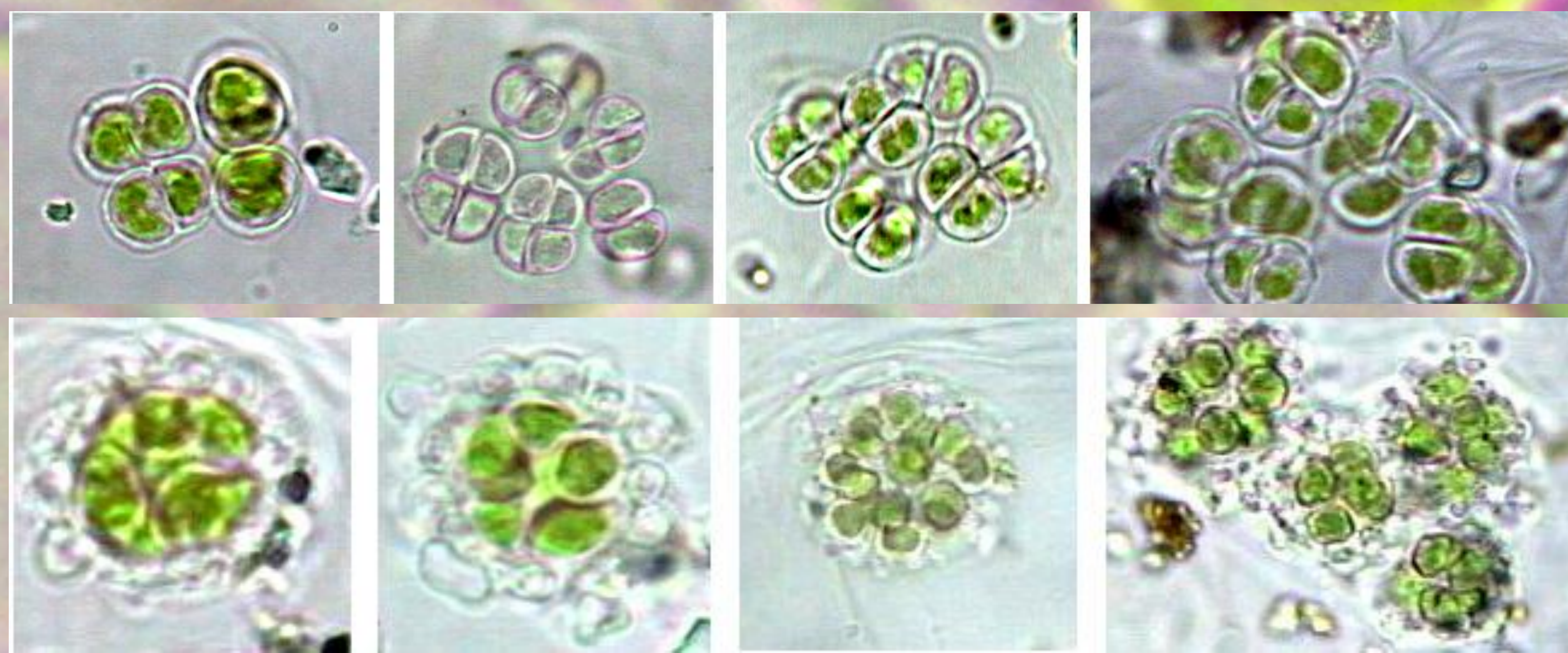


Fig. 1. Airborne algae Chlorococcales (upper) and lichen soredia (lower)

## Material and Methods

Sampling was taken using a seven day recording spore trap (Burkard) for two years (1998-1999), it was located 15 meters over the ground level at the terrace roof of the hospital of Mérida (SW Spain) (Fig. 2). Algae and lichen soredia were identified and counted using two longitudinal scans over the slides with x1000 microscope resolution. Meteorological data and airborne algae and lichen soredia concentrations were analysed using Spearman correlation coefficient.

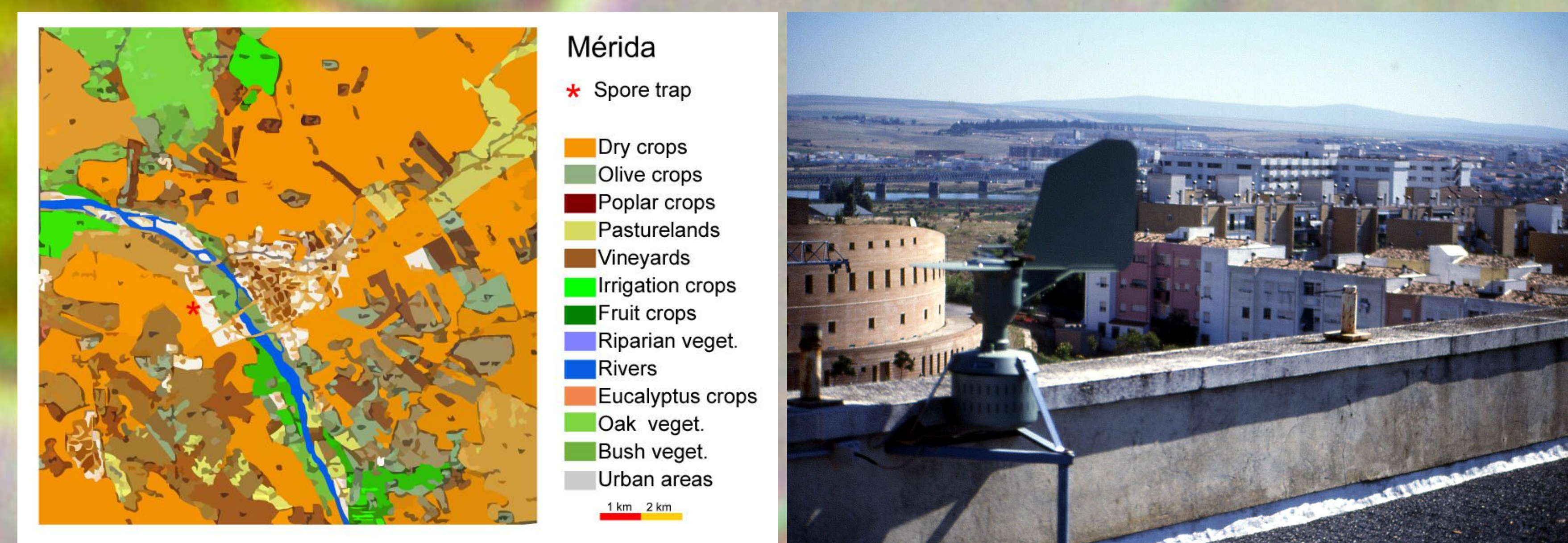


Fig. 2. Location map of spore trap in Mérida and image on the terrace hospital

## Results

Most algae identified are *Chlorococcales*, forming coenobia of 2-8 cells, with an average concentration of 20 coenobia/m<sup>3</sup>. June was the month with the highest concentrations and January with the lowest. Maximum peak reached a value of 401 coenobia/m<sup>3</sup>. Diatoms were found with an average concentration of 0.8 cells/m<sup>3</sup>, more often in Summer and most of them were *Cyclotella* like forms. Other green algae, including filamentous forms or even *Pediastrum* sp. coenobia, were found. Lichen soredia were recorded with an average concentration of 0.4 soredia/m<sup>3</sup>, without a clear seasonal pattern (Fig. 3). Algae concentration showed a statistically significant positive correlation with temperature and negative with relative humidity and precipitation, nevertheless lichen soredia did not showed this relationship. Wind direction affected algae concentration, with a statistically significant positive correlation with winds from West and negative from Est, whereas lichen soredia showed statistically significant positive correlation with wind from NE and negative from SW (Fig. 4).

## Conclusions

Airborne algae and lichen soredia are present in the air along the year. Algae showed a seasonal pattern affected by temperature, relative humidity and wind direction. Watercourses are not considered as the main potential sources of airborne algae because the main river is located opposite to the predominant wind direction, nevertheless irrigated crops seems to be their origin and soilborne algae may constituted the bulk of aeroalgal flora. Lichen soredia seem to be present in the air when wind blow from holm oak woods.

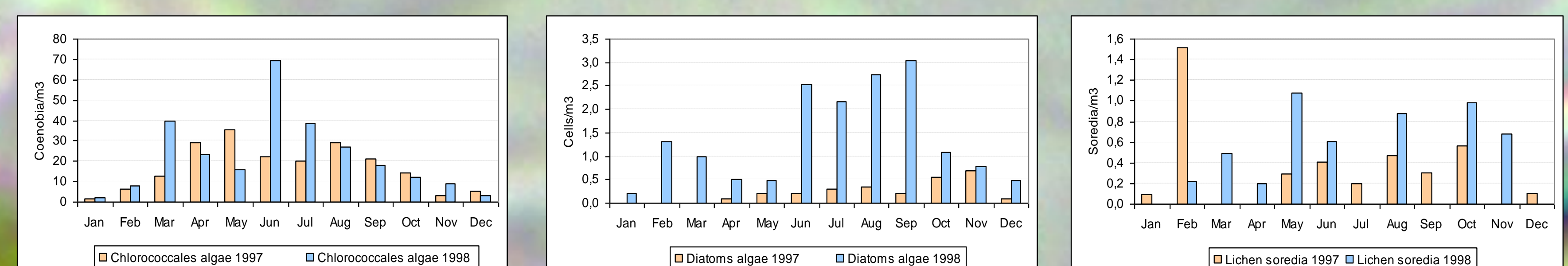


Fig. 3. Monthly concentration of airborne algae and lichen soredia

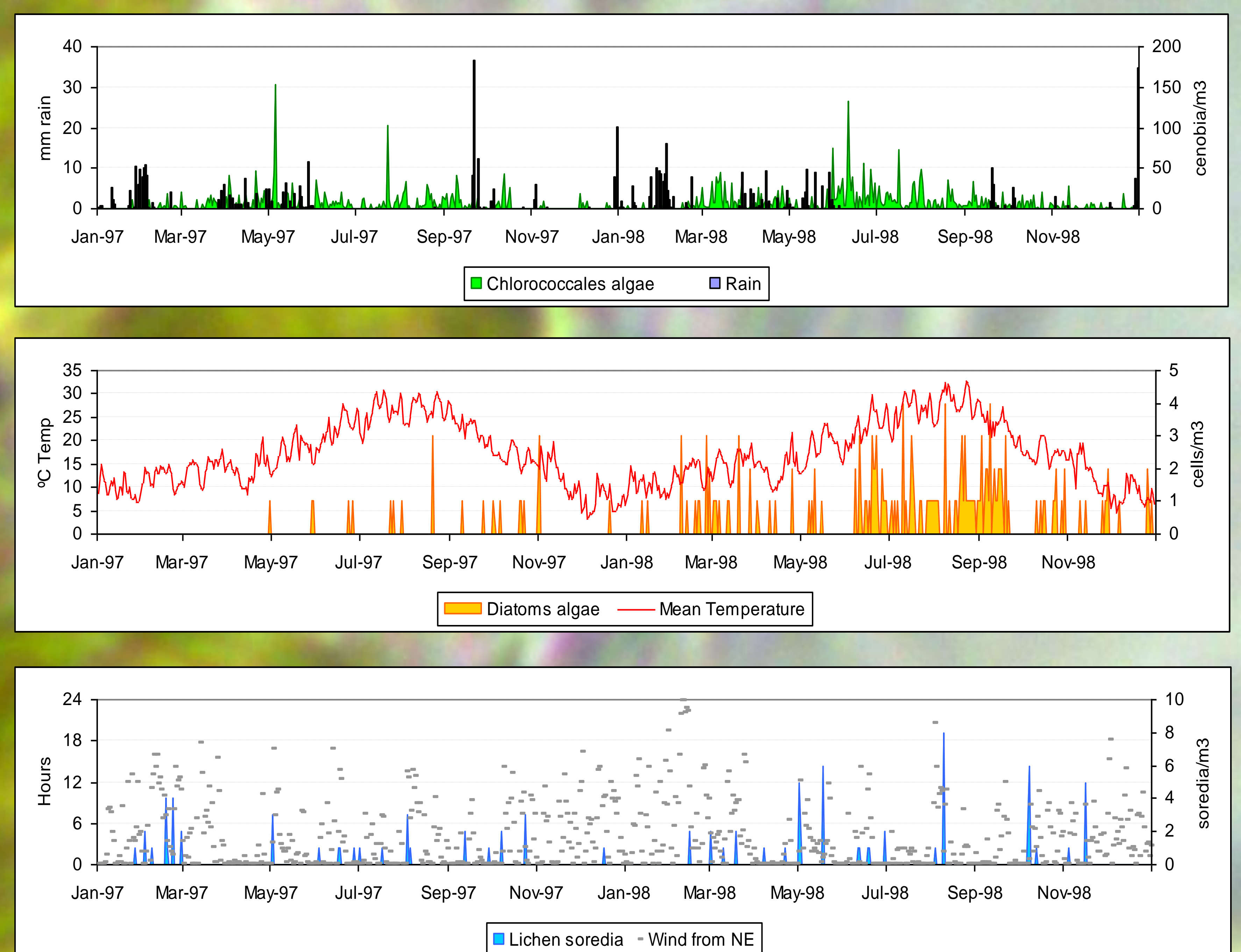


Fig. 4. Daily concentration of algae and lichen soredia for the two years studied