ABSTRACT BOOK

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ONE HEALTH

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AIRBORNE POLLEN IN ALPINE SITES

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Introduction

Airborne pollen is usually monitored at urban centers, where most people live, to provide information on types and amount of allergenic pollen. Thus, very few aerobiological data are available for remote, mountainous sites. This study aims to characterize the biological quality of the air in an alpine valley in Trentino (North Italy), a region highly interested by the presence of tourists (e.g., 9.3 million overnight stays registered during June - September 2021).

Materials and Methods

An aerobiological study was carried out during late spring and summer in 2020 and 2021 in Val di Rabbi, an alpine valley located in the Trentino sector of Stelvio National Park. Gravitational Sigma-2 samplers were selected for the survey, for their reliability and efficiency (VDI_2119 2013) and easy handling at remote sites (Gottardini et al. 2021), and installed at 2 m above ground level in 5 sites located at altitudes ranging from 700 to 2000 m a.s.l. Sampling surfaces, treated with an adhesive medium, were analyzed by optical microscopy (OM; 400×; Leitz Diaplan) for pollen identification and count (weekly samples); the average daily sedimentation rate (P cm^{-2} d^{-1}) was calculated for the June-August period. In 2021, an active Hirst-type sampler was concurrently installed in one of the five sites (daily samples). Samples were processed and analyzed following conventional techniques and standardized protocols (UNI EN 16868:2019).

Results and Discussion

In the two study periods, the number of identified pollen taxa ranged from 25 at the highest elevation site (2000 m a.s.l.) to 39 at the lowest elevation (700 m a.s.l.). The proportion of arboreal pollen slightly decreased with the altitude, from 51% to 42%. The three most abundant pollen taxa

were pine (Pinus), grasses (Poaceae) and neetle (Urticaceae), even if in different proportion at each site. The only grass and nettle allergenic pollen represented on average the 52% of the total pollen. The pollen season peak for grasses showed a delay of about 4 days every 100 m of elevation (Figure 1).

47 pollen taxa were identified, by active sampling, 10 more than by the passive one. The most abundant pollen taxa detected by active sampling were pine, grasses, and nettle, as for passive sampling, with the last two representing even the 71% of the total. The pollen season peak for grasses was on 22nd June, coherently with the passive sampling results at the same site.

Conclusions

Our mountain aerobiological study reveals the presence of allergenic pollen even at high altitude, with noteworthy shifts in the pollen season. The surveyed data can be further exploited for studying the plant biodiversity in remote areas, as well as to provide useful information for allergic tourist and hikers. Moreover, passive sampling proved to be a feasible solution for aerobiological studies in remote or orographically complex areas, typically excluded in routine air quality monitoring.

References

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Figure 1