

Recommended Terminology for Aerobiological Studies.

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Aerobiology is an interdisciplinary science where researchers with different backgrounds are involved in different topics related to microorganism, airborne biological particles, e.g. pollen and spores, and phenology. Some concepts, words or expressions used in aerobiology have a clear definition, but are however frequently misused. Therefore, the working group “Quality Control” of the European Aerobiology Society (EAS) and the International Association of Aerobiology (IAA) would like to clarify some of them, their use and presentation.

Allergen [n.m.]: any substance that can elicit allergic symptoms.

Allergen concentration (ng/m³) or (pg/m³): the amount of allergen per unit volume of air expressed in nanograms/m³ or picograms/m³

Allergenic [adj.]: relating to or having the effect of an allergen.

Allergology [n.f.]: a branch of medicine concerned with allergy.

Annual (or Seasonal) Pollen (or Spore) Integral (APIn or SPIn or ASIn or SSIn), expressed as (Pollen*day/m³) or (Spore*day/m³), (not total, not index): integral over time of pollen (or spore) concentration. It can be obtained by summing the average daily concentration over the given period of time, or equivalently by multiplying the average concentration of the whole season by the season duration. These terms have been traditionally presented as an index, i.e. API or SPI. In case of SPIn or SSIn, it is recommended to take into consideration the defined Main Pollen Season.

Bacterium [Bacteria, pl.]: a large domain of prokaryotic microorganisms.

Bacterial Concentration (CFU/m³) or (CFU m⁻³): the number of airborne bacterial cells per unit volume of air.

Colony-Forming Unit (CFU): colonies of airborne bacteria or fungi developed on a culture medium.

Colony Count (alternatively Culturable Fungal Spore Count): the result of the culture analysis or the raw data. Culturable spores is a subset of all viable spores and the count is an integer quantity obtained from the culture analysis which cannot be compared (e.g. from one analysis to the other, or one study to the other) and needs conversion to concentrations.

Culturable Fungal Spore Concentration (CFU/m³) or (CFU m⁻³): the number of Colony-Forming Unit *per* unit volume of air for culturable sampling method - in other words the spore concentration of Colony Forming Units. Averaging time for the concentrations may be very short (e.g. 2 min or 10 min), but does vary and is therefore not reflected in the unit, which always remains the amount-per-volume, but averaging time needs to be mentioned in relation to the provided values.

Fungal Spore: sexual or asexual reproductive unit of fungi, capable of developing a new individual. To be differentiated from “fungal propagule”, which includes in addition viable hyphal fragments that can also develop in a mycelium.

Fungus [Fungi, pl.]: a eukaryotic microorganism classified in the Kingdom of Fungi. It does not include fungi-like organisms, such as slime molds and water molds.

Main Pollen (or Spore) Season (MPS or MSS): duration of time when pollen or spores are present in the atmosphere in significant concentrations at a location. There are different methods to define the main season start and end. The selection of the most suitable method depends on the main goal of the study, e.g., focusing on phenology or on pollen/spore exposure. The method used should always be clearly identified.

Mould (Mold): a microfungus, especially an economically important saprobe (Kirk et al. 2001). Common name that includes some Fungi known often in their anamorphic phase, with asexual reproduction by mitosis, i.e. Mucorales and some mitosporic fungi.

Pollen (or Spore) Allergen Potency (not Pollen or Spore Potency, not Allergy Potency), expressed as (ng/Pollen grain) or (ng/Spore) or (pg/Pollen grain) or (pg/Spore): amount of allergen *per* pollen grain or *per* spore, measured as mass in nanograms or picograms *per* pollen grain or spore.

Pollen (or Spore) Allergy Potency: presence of major and minor allergens in the pollen grain. The allergy potency of the pollen of a species is its ability to cause an allergy to a significant part of the population. The pollen allergy potency is the same for the same species anywhere.

Pollen (or Spore) Allergy Risk: the capacity of a pollen grain, alone or with other factors such as air pollution, to induce health impact. The allergy risk depends on multiple factors, i.e. pollen concentration, location, date in the season, meteorological conditions, environmental pollutant.

Pollen (or Spore) Calendar: a graphical representation of the annual characteristics of major airborne pollen or spores recorded in a given location, which is an average of several years of data (a minimum of 5 years is generally recommended). Depending on the use and the target audience of the pollen calendar, there are several methods for the calculation and for the graphical presentation. A proposition for a more scientific pollen calendar is given by Spieksma (1991), which displays columns of 10 day average pollen or spore concentrations on a logarithmic scale. For pollen calendars for the public, a presentation with the same pollen concentration units, which are used also in pollen forecasts, may be more convenient (Gehrig et al, 2017).

Pollen (or Spore) Concentration (not Pollen or Spore Count), expressed as (Pollen grains/m³) or (Pollen grains*m⁻³) or (Pollen/m³) or (Pollen*m⁻³) or (Spores/m³) or (Spores*m⁻³) of air, but not (Pollens/m³) or (Grains/m³) or (g/m³) or (s/ m³): the number of airborne pollen grains or spores per unit volume of air. Averaging time for the concentrations can vary, e.g. commonly

used periods are one day, or two hours (daily and 2-hours concentrations, respectively). The averaging period is not reflected in the unit, which always remains the amount-per-volume, but needs to be mentioned in relation to the provided values.

Pollen (or Spore) Count: the result of the slide analysis or the raw data. It is an integer quantity obtained from the microscopic analysis which cannot be compared (e.g. from one microscope to the other, or one study to the other) and needs conversion to concentrations.

Pollen Emission (not Pollen Production), expressed as e.g. (Pollen/hour*m²) or (Pollen/year*m²): pollen release *per time per area*. Depending on the use and the target, pollen emission is sometimes expressed in other units, such as *per plant, per biomass*, etc. It is recommended, according to convention in air quality, to provide final emissions with both a spatial and temporal resolution.

Pollen Grain (not Grain, not Pollens): male gametophyte of seed plants (either angiosperms or gymnosperms). Pollen (singular and plural) relates to any number of pollen grains.

Pollen Production (not Pollen Count) (e.g. Pollen/anther): quantity of pollen produced *per anther* in Angiosperms or *per microsporangium* in Gymnosperms. Pollen production is sometimes expressed *per flower* or *inflorescence* in Angiosperms or *per male cone* in Gymnosperms, *per plant* or *per area*.

References

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