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• 中文摘要

台灣地區大氣中生物性微粒的成份和濃度變化以及其健康效應，尚未有完整詳盡的資料。而在大陸沙塵襲台期間，是否會改變本土生物性微粒的成份和濃度，增加民眾健康和生態環境的負荷，亦值得關切。本研究配合環保署之相關沙塵研究計畫，在沙塵暴期間及前後一天，於新莊超級測站及石門測站進行沙塵中生物性微粒的監測，以評估沙塵對生物性微粒成份及濃度的影響，並於計畫期間進行每月之固定採樣，以建立大台北地區生物性微粒之背景資料。 本研究主要測量的生物性微粒包括可培養性真菌及真菌孢子，分別提供大氣中真菌種類、以及大氣中總真菌濃度之資料。研究結果發現，Aspergillus、 Aureobasidium、Chaetomium、及 Yeast 在沙塵來襲期間濃度顯著高於非沙塵期間。而三種出現頻率極低 (<5%) 之真菌：Botrysporium、Rhinocladiella、Trichothecium 只出現於沙塵暴期間。這些真菌種類的出現是否爲大陸沙塵挾帶來台，仍有待進一步證實。此外，真菌孢子濃度雖然在沙塵暴來襲期間前後，並沒有顯著的不同，但其與 PM2.5 的相關性，顯示沙塵中攜帶生物性成份來台的可能性仍相當高。本研究計畫經由每月固定採樣，建立大台北地區大氣中真菌濃度分佈及主要組成菌屬之背景資料。在台北地區出現頻繁且濃度較高之菌屬包括 Non-sporulating Fungi、Cladosporium、Penicillium、Aspergillus、Curvularia、Fusarium、Alternaria、Botrytis、Arthrinium、及 Coelomycetes。影響真菌濃度之環境因子複雜，包括季節、空氣污染物及氣象因子等等。 今年度大陸沙塵的影響較前兩年爲弱，然而，本計畫仍有觀察到生物性微粒組成成份及濃度在沙塵期間前後之變化，顯示沙塵中攜帶生物性成份來台的可能性相當高。未來應持續進行相關之環境監測及暴露評估，以進一步了解沙塵可能造成之健康及生態上之危害。

• 英文摘要

The health effects and distributions of various outdoor biological particles in Taiwan have not been fully investigated. Whether foreign biological microorganisms will be introduced to Taiwan during China dust storm period is of special concern. In this study, we monitored outdoor bioaerosol levels

before; during and after each dust storm period at the EPA designated sampling locations. In addition, we measured bioaerosol levels monthly at each sampling location in order to establish baseline data in the Taipei area. We measured culturable fungi and fungal spores simultaneously to gather complete information on fungal genera and overall fungal levels, respectively. We found that Aspergillus, Aureobasidium, Chaetomium, and Yeast had higher levels during dust storm period. A few rare fungi, including Botrysporium,Rhinocladiella,Trichothecium, were only recovered during dust storm periods. Although fungal spore levels did not increase during dust period, its positive association with PM2.5 suggested the possibility of dust storm sands as a carrier of fungi. Based on our monthly sampling, we established baseline data of fungal distributions and major taxa in the Taipei are. The most prevalent fungi include Non-sporulating Fungi, Cladosporium, Penicillium, Aspergillus, Curvularia, Fusarium, Alternaria, Botrytis, Arthrinium, and Coelomycetes. Fungal levels were associated with a variety of air pollutants and meteorological factors. The magnitudes of China dust storms in this year were not as intense as previously. However, we still found statistically significant increases of certain fungi, indicating the possibility of foreign microorganisms carried by dust storms. Environmental monitoring and exposure assessment should be conducted to further evaluate the effects of dust storm on public health and on ecology in Taiwan.