# Moss: A bio-monitor of atmospheric nitrogen deposition in the Yangtze River Delta

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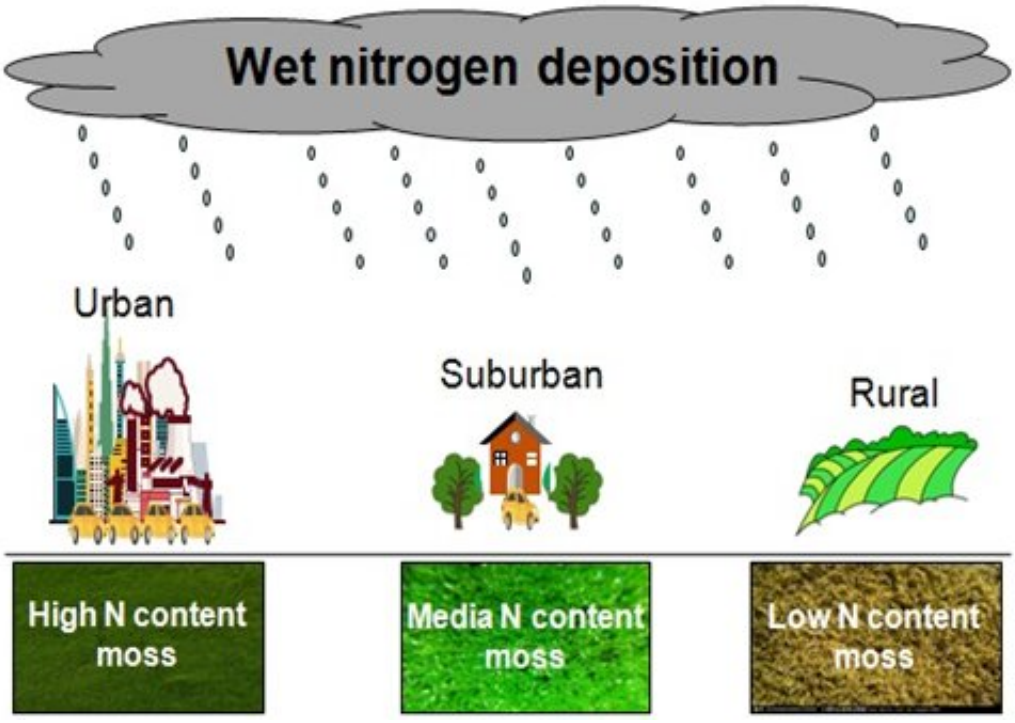


Wet deposition and moss signature in urban, suburban, and rural sites. Credit: Tao Huang

Atmospheric reactive nitrogen (N) deposition has more than doubled over the past century. It is very important to estimate the rates and sources of N deposition because it's considered as a main factor of ecosystem structure changes, such as soil acidification, water eutrophication and biodiversity losses, especially in countries with high N deposition, such as China. However, it is very difficult to obtain monitoring data of atmospheric N deposition because of the complexity of N species and the diversity of deposition forms.

Mosses are very widespread. Almost all nitrogen for moss growth comes from the air and rainfall. Therefore, many researchers investigate N deposition levels and its effects by using moss, especially in Europe and Southwest China. However, whether mosses can be used to monitor atmospheric N deposition in the Yangtze River Delta (YRD) region has yet to be determined.

"We collected rainwater and moss tissue at six monitoring sites in the YRD with three land-use types—urban, suburban, and rural and analyzed moss (*Haplocladium microphyllum*) N content, wet N deposition rate, and their N isotope signatures," says Dr. Tao Huang, from the School of Geography, Nanjing Normal University.

Based on this study, they found a significant linear relationship between moss N content and wet N deposition rate. In addition, they also determined a consistent decreasing trend for moss N content and wet N deposition from urban to suburban to rural areas. The more negative N isotopic signature of suburban and rural mosses indicated N is mainly released from agricultural ammonia, while the less negative N isotopic signature of urban mosses highlighted a main influence from fossil fuel combustion and traffic emissions. The findings are published in *Atmospheric and Oceanic Science Letters*.

"The important revelation of our study is that the epilithic moss

*Haplocladium microphyllum* can bio-monitor the rates and sources of atmospheric N deposition in the YRD, making up for the lack of monitoring data of N deposition," concludes Dr. Huang.

**More information:** Zhili CHEN et al, Atmospheric nitrogen deposition in Yangtze River Delta: insights gained from the nitrogen content and isotopic composition of the moss Haplocladium microphyllum, *Atmospheric and Oceanic Science Letters* (2019). DOI: 10.1080/16742834.2019.1688629

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