

# 植物對過氧硝酸乙醯酯的吸收及其反應

呂宜玲 邱品叡 孫岩章\*

國立台灣大學植物病理與微生物學系

## 摘 要

利用體積2升之小型熏氣箱系統，針對十五種草、木本植物測試其27 ppb過氧硝酸乙醯酯吸收之能力。所得結果各植物之沉降速率範圍為0.083 mm/s至0.88 mm/s，大小依次為小米菊、劍葉萵苣、龍葵、茄苳、垂榕、黃金榕、福木、牽牛花、鵝掌藤、雙福番茄、翡翠寶石、黃金葛、白鶴芋、白木萬年青、變葉木。期中室內觀葉植物之沉降速率普遍小於PAN指標植物者及常見之綠化樹種如茄苳、垂榕、黃金榕、福木等。將本研究所得之各吸收值與Okano等人(1990)報告之九種草本植物對PAN吸收值相比較，得知本研究中除了變葉木吸收力較低外，其餘植物之吸收力皆高於Okano等人(1990)所測者。

以垂榕葉片對不同濃度之PAN進行吸收測試，吸收速率會隨濃度上升而上升，證明植物對過氧硝酸乙醯酯的吸收乃為一被動性擴散，但龍葵和牽牛花在過氧硝酸乙醯酯濃度達82 ppb以上時，吸收速率即明顯下降了，此表示葉片以受過氧硝酸乙醯酯為害促使吸收力不增反降。

在不同光度下對小米菊、劍葉萵苣、龍葵、牽牛花、垂榕、福木等六種植物之葉片進行吸收力測試比較，結果發現在光度達34000 Lux時，其吸收值遠高於光度450 Lux者，其吸收速率後者比前者分別減少了68%、27%、53%、13%、71%、48%。

針對龍葵之不同葉序進行吸收能力之比較，發現不同葉序之吸收能力會有不同，葉序碼越大即葉齡愈大者，其吸收能力愈大，但並非皆成規律性增加；另外福木成熟葉與幼葉之吸收能力亦有差異，成熟葉之吸收速率約為幼葉之2.1倍。

利用同一葉片枝垂榕，在不同光度下進行PAN吸收測試，並以蒸散測定儀測試葉片之水分氣孔通導度，可估算求得垂榕之PAN氣孔通導度及PAN角質層通導度，其角質層通導度值遠低於氣孔通導度。另外由垂榕PAN氣孔通導度和PAN總通導度之相關回歸分析，測知調控垂榕PAN總通導度者，主要是葉肉通導度，但氣孔通導度亦不可忽略。

本研究對茄苳、垂榕、黃金榕、福木測定PAN與臭氧之吸收力，得知四種植物對臭氧的吸收普遍大於PAN者，即植物淨化臭氧之能力常大於過氧硝酸乙醯酯者。

**關鍵詞：**吸收；過氧硝酸乙醯酯；反應。

\*通訊作者

## Studies on Uptake of Peroxyacetyl Nitrate by Plants and Their Response to Peroxyacetyl Nitrate

Ying-Ling Lu, Pin-Zui Chiu and En-Jang Sun\*

*Department of Plant Pathology and Microbiology, College of Bioresources and Agriculture,  
National Taiwan University*

### Abstract

An two-liter small fumigation system was designed to measure the uptake rate of PAN of fifteen grass and woody plants. The concentration of 27 ppb was used throughout the experiment. Their deposition velocities ranged from 0.083 to 0.88 mm/s. Quickweed (*Galinsoga parviflora* Canvanilles.) appeared to have the highest uptake rate, followed by lettuce (*Lactuca sativa* L. Cv. Sword Leaf), black nightshade (*Solanum nigrum* L.), red cedar (*Bischofia javanica* Blume.), white bark fig (*Ficus benjamina* Linn.), golden fig (*Ficus microcarpa* cv. Golden leaves), common garcinia (*Garcinia subelliptica* Merr.), morning glory (*Pharbitis nil* Choisy cv. Scarlet O'Hara), scandent scheffera (*Schefflera arboricola* Hay.), tomato (*Lycopersicon esculentum* Mill. cv. Double-fortune), emerald gem (*Homalomena* 'Emerald Gem'), epigremnum (*Rhaphidophor aurem*), spathiphyllum (*Spathiphyllum rochii*), dumbcanes (*Dieffenbachia* 'Camilla'), and croton joseph's (*Codiaeum variegatum* Juss.).

The uptake rate of PAN by indoor ornamental plants are generally lower than those possessed by PAN indicator plants and outdoor ornamental trees such as red cedar, white bark fig, golden fit, and common garcinia etc. The results obtained in this study were compared with those of nine grass plants measured by Okano et al., (1990), showing that all of the uptake rates of tested plants in this study are higher than those measured by Okano except one indoor plant, the croton joseph's.

Testing the uptake rate of White bark fig rose when the PAN concentration increased. This indicated that the Pan uptake by plants is by passive diffusion. However, when the concentration exceeded 82 ppb, the uptake rates of black nightshade and morning glory obviously. This is due to that the leaves has been injured.