

**Title** *Pittosporum* cut branches: characterization and prevention of the brown spots on the variegated leaves during growth and sea transport

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### Abstract

*Pittosporum* (*Pittosporum tobira* Thunb. cv. 'Variegata') branches with variegated leaves are very demanded in the cut foliage industry as bouquets fillers. However, their quality is reduced due to brown spots appearing mainly on the white parts of the variegated leaves, on which pathogens are developed later on. This physiological disorder appears already in the field, and is aggravated following prolonged sea transport from Israel to USA (4 weeks at 2°C). Our survey performed among various *Pittosporum* growers showed that increased appearance of brown spots in the field was associated with a rapid vegetative growth under red nets which may lead to nutrient deficiency, poorly drained or wet and heavy soil, poor ventilation and increased plot age. Increased leaf browning observed under red net compared to black net at the same light intensity was accompanied with reduced water uptake of the cut branches, indicating that increased water uptake may reduce leaf browning. Examination of leaf anatomy revealed that the white parts of variegated leaf blades have lower densities and thickness of palisade cells than do fully green parts, and have a 30% higher stomata density. This suggests that the white leaf areas are more susceptible to water loss and radiation stress. The brown spots examined under UV light were characterized as oxidized polyphenols, indicating the involvement of oxidative processes leading to leaf browning and necrosis. Indeed, postharvest pulsing treatments with antioxidants alleviated the incidence of the browning symptoms following sea transport simulation to USA. Analysis of macro and micro elements revealed that brown leaves had lower levels of N and K, but higher levels of Ca, Na and Cu as compared with healthy leaves. It is possible that changes in these elements may increase levels of reactive oxygen species, thereby leading to oxidation of the polyphenols in the white susceptible leaf areas.