

Brazil

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Brazil is the largest producer in the world of oranges for processing. Their large industry is located mostly in São Paulo State, but some citrus groves can be found in other States such as Paraná. Among the problems faced by their growers are canker and, more recently, Huanglongbing (greening). Windbreaks are used to help manage canker disease. The common tree species for this purpose is *Grevillea robusta*, the silk oak. In Paraná, where canker is endemic, *Casuarina cunninghamiana* is common as a windbreak species. Other species unfamiliar outside of Brazil are illustrated below.

(Photos provided by Jim Graham and Leandro Cezar Teixeira)



Fig. 1. An artificial windbreak in use for a research study in the State of Paraná, Brazil.



Fig. 2. An artificial windbreak employed around greenhouse structures.



Fig. 3. A windbreak combination of *Grevillea robusta*, silk oak, and Napier grass.



Fig. 4. Grevillea robusta in a perimeter windbreak planting.



Fig. 5. A mature stand of Napier grass used as an internal windbreak.



Fig. 6. Hedgerows of Sansão do Campo (*Mimosa caesalpineafolia*), a legume used primarily along roads to help prevent dust from coating nearby citrus trees. It is a thorny plant that also provides a degree of security.



Fig. 7. Guandu (Cajanus cajan - pigeon pea), a legume, in use as a temporary windbreak.



Fig. 8. Napier grass (Pennisetum purpureum) as a perimeter and internal windbreak.



Fig. 9. A slash pine windbreak.



Fig. 10. A new citrus grove planted on the land contours with windbreaks.

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