

CULTURAL CONTROLS: Windbreaks



INTRODUCTION:

Windbreaks are barriers used to reduce and/or redirect wind around and within crop production fields. They may be annual crops/grasses or perennial grasses, trees and shrubs. While windbreaks are typically thought of in terms of protecting crops from wind and cold, they may also increase plant diversity and provide an important habitat or reservoir for both pest and beneficial insects. The impact a windbreak has on the crop and the pests within that crop varies depending on the height, density, species and other factors.

BENEFITS OF WINDBREAKS:

- Windbreaks reduce wind speed, reducing wind erosion and abrasion to crops from wind-blown sand. This helps reduce disease by reducing entry points for pathogens (**Figure 20**).
- Planted windbreaks create plant diversity, providing homes for a wider range of microbes, insects, plants and wildlife which can be beneficial for crop plants.
- Even large wild or native plants on field borders can serve both as windbreaks and as habitat as well as nectar and pollen sources for parasitoids and a source of alternate prey to sustain predators between seasons. These borders are usually not intensively managed and if left standing can increase the diversity of plants.
- Although rye windbreaks on irrigation ditch areas and roadways are the most common, sorghum can also be effective as can sugarcane in Central/South Florida.
- Windbreaks can serve as a physical barrier to movement of insects to, from and within a crop field. This is advantageous if entry of pests is blocked or outward movement of natural enemies is hindered.



Figure 20. Windbreaks are often planted on irrigation ditches in tomato fields to protect from ‘sand blasting’ and desiccation. This is especially true in spring; however, the windbreak must be planted early enough to be taller than the crop plants they are supposed to protect. Here a shorter growing rye species is planted between rows to reduce rain splashing of soil and pathogens onto plants. Photograph by: Phyllis Gilreath.

How a Windbreak Works

As wind approaches a windbreak, some moves through the barrier but most moves up and over. This results in a reduction in wind speed both windward (side toward the wind) and leeward (side away from wind). On the windward side, the protected zone extends 2-5 times the height of the windbreak. On the leeward side, the protected zone generally extends 10 to 20 times the height.



POTENTIAL PROBLEMS:

- To provide year-round benefits, windbreaks must contain either a coniferous species or a dense shrub understory (**Figure 21**).
- Some windbreaks may be alternate hosts to undesirable plants. For example, rye grass may harbor aphids and thrips which may be pests or in some cases may only be a nuisance.
- Hurricane-force winds have been observed to actually increase damage to tomato plants on the windward side of a perennial windbreak due to the turbulence created. Windbreak densities of 60-80% are recommended to minimize this problem (**Figure 22**).
- By changing temperature, shade and humidity levels, windbreaks can alter the microclimate, especially that of the cropped area in closest proximity. This can have either a positive or negative effect on pest pressure depending on the crop or pest.
- Weak flyers (aphids, thrips, whitefly, etc.) are carried further by wind and have been observed to utilize tall trees as obstructions, enabling them to settle and later move to crop fields.
- In some cases, crops closest to the windward side of boundary plantings are less likely to be infected by insect species that are carried by the wind, emphasizing the need for scouting interior plants to maintain control.

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Figure 21. Here, rye is planted as a temporary windbreak on ditch rows within the field and southern red cedar is planted on individual field borders as a permanent windbreak. Photograph by: Phyllis Gilreath.



Figure 22. Wind can desiccate plants and wind-blown sand can abrade young seedlings, causing loss of foliage and crop delay or even death. Tomato stakes can actually help protect young plants if wind is blowing down the row instead of across the row. Photograph by: Phyllis Gilreath.

REFERENCES:

Brandle, J.R. and L. Hodges. Field Windbreaks. University of Nebraska Extension Publications EC00-1778-X. <http://ianrpubs.unl.edu/Forestry/ex1778.htm>.

University of Georgia. Warnell School of Forest Resources and College of Agricultural and Environmental Sciences - Dept. of Entomology. 1999. The insect-pest situation in agroforestry. In *Insect Pests in Agroforestry*. <http://www.bugwood.org/agroforestry/insects/html/insect-pest.html>.