EXTENSION NOTES

Ontario

THE BENEFITS OF WINDBREAKS

Windbreaks are rows of trees or shrubs that reduce the force of the wind. They can reduce soil erosion, increase crop yields and protect livestock from heat and cold. Windbreaks can shield buildings and roads from drifting snow. They beautify the landscape and provide travel routes and habitat for wildlife. Windbreaks can also be sources of wood and food.

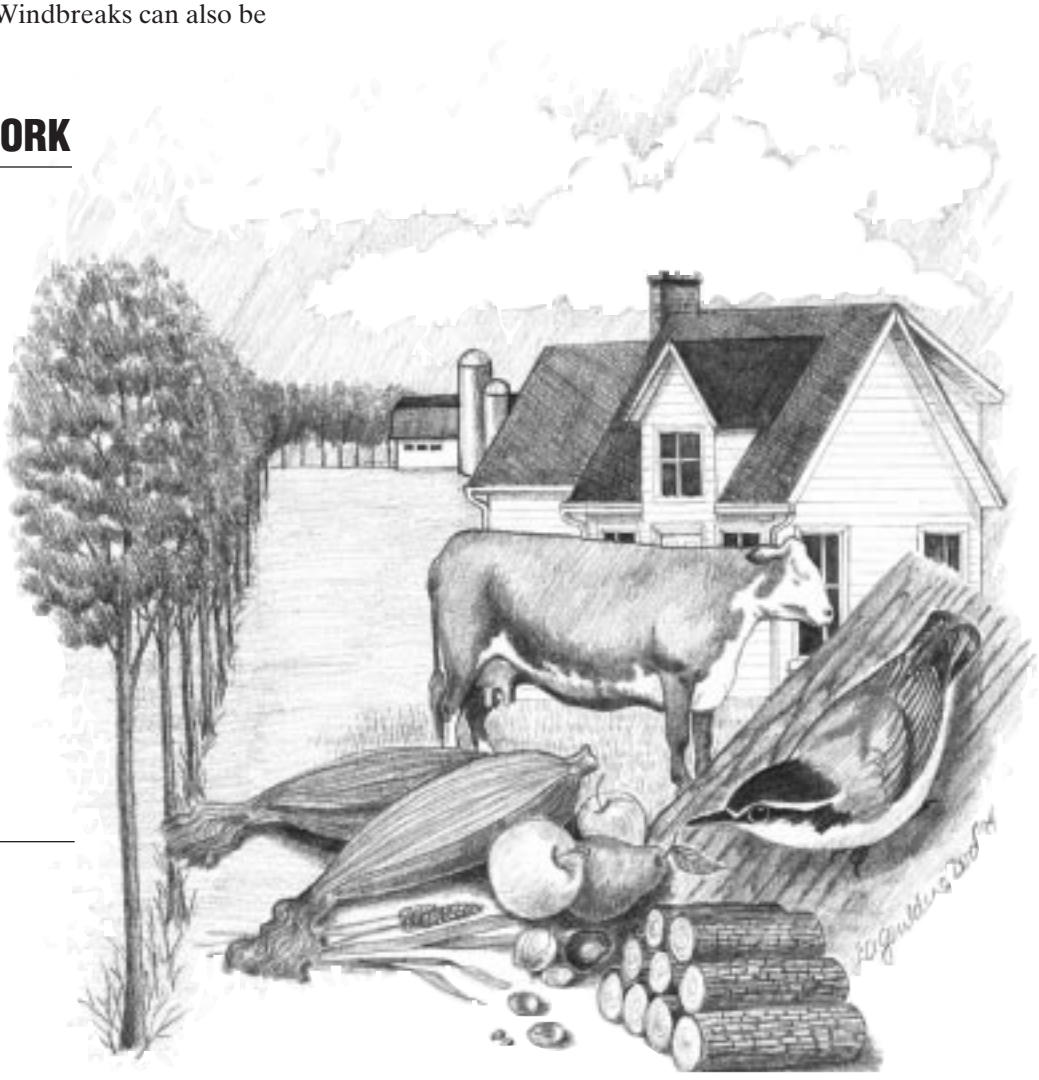
This extension note provides information on some of the many benefits of windbreaks, as well as factors to consider when designing a windbreak for your property.

HOW WINDBREAKS WORK

By reducing wind speed, windbreaks modify the climate in the areas they shelter. The effects of reduced wind speed are:

- Moderated soil and air temperatures
- Increased relative humidity
- Reduced evaporation and increased soil moisture
- Changes in the distribution of snow

These effects are determined by a windbreak's height, length, density, location and species of trees or shrubs.



EROSION CONTROL

The trend toward larger fields has helped to increase soil erosion in Ontario. The removal of windbreaks, natural fence rows and other barriers to wind exposes soil to wind.

Illustration by M.C. Rodrick

Windbreaks can reduce soil erosion by:

- Reducing the occurrence of winds that are strong enough to carry soil away
- Reducing the loss of soil moisture, which binds soil particles together and makes them less likely to be blown by wind

IMPROVED CROP QUALITY AND YIELD

Windbreaks increase crop quality and yield in sheltered areas by:

- Providing lower temperatures in the day and warmer temperatures in the night
- Increasing relative humidity and helping to retain soil moisture
- Reducing physical damage caused by high wind

The amount a crop will benefit from a windbreak depends on the site, windbreak design and crop variety. In studies of field crops, soybean yields in southwestern Ontario were 25 per cent higher when grown in areas sheltered by windbreaks. Corn yields were six to eight per cent higher. Winter wheat, barley, rye, alfalfa and hay yields increased when fields were sheltered, while spring wheat and oats responded to a lesser degree. Vegetable and specialty crops improved in both yield and quality.

In studies of orchards, windbreaks improved pollination and fruit set. Physical damage caused by whipping leaves, branches and fruit was also reduced.

IMPROVED LIVESTOCK PRODUCTIVITY

Windbreaks increase the health of livestock and the survival rates of young animals by protecting livestock from heat in summer and cold and wind in winter. Protection from extreme cold also increases productivity by allowing food energy to be used for growth and milk production, rather than for maintaining body heat. In this way, windbreaks can reduce the amount of food animals require to keep warm in winter.

Because animals graze less when exposed to heat, the shade provided by windbreaks also helps to increase productivity in summer.

The best windbreaks for animals are designed to reduce the speed of the wind without creating drafts or turbulence.

REDUCED HEATING AND COOLING COSTS

Windbreaks help to save energy and to reduce the cost of heating and cooling by protecting buildings from winter wind and summer sun. Windbreaks can reduce winter heating costs up to 25 per cent. The reduction in summer air conditioning costs from windbreaks can be quite dramatic. The cooling effect of one mature deciduous tree is equal to 10 room-sized air conditioners.

Windbreaks can also protect greenhouses from heat loss in winter. Studies suggest that heat loss from greenhouses doubles as wind speed increases from zero to 24 kilometres an hour. Windbreak protection can decrease heat loss by 10 to 15 per cent.

IMPROVED SNOW DISTRIBUTION

Windbreaks can be designed to control snow in different ways.

Dense windbreaks are useful for protecting roads and farm yards from drifting snow. They retain snow and shape it into deep, narrow drifts.

Windbreaks of open structure, which distribute snow evenly over fields, are useful for protecting crops, reducing soil erosion and increasing soil moisture. Studies suggest that a layer of snow 20 centimetres deep completely protects the soil from freezing. A single row of trees is most effective because it allows air to flow through the gaps between trees. This type of windbreak can distribute snow evenly over a distance 25 times the height of the trees.

FOOD AND WOOD PRODUCTION

In addition to their role in providing shelter, windbreaks can be designed to provide both food and wood. They can produce fruit, nuts, maple syrup, firewood, posts, poles, veneer and sawlogs.

WILDLIFE HABITAT AND OTHER BENEFITS

Windbreaks can provide shelter and food for wildlife, as well as safe travel corridors between woodlots. They can also provide nectar and pollen for bees.

Windbreaks can act as sound barriers. They also filter dust from the air and improve the appearance of the rural landscape.

Illustration by M.C. Rodrick

FACTORS TO CONSIDER WHEN DESIGNING WINDBREAKS

Windbreaks are designed to perform specific jobs. The best tree or shrub species to use, the spacing between trees, the size of the windbreak and its location are determined by the characteristics of the land and the job you want the windbreak to do.

When planning a windbreak, you need to consider the shape and orientation of the property, wind speed and direction, and the way snow accumulates. The positions of buildings, roads, power lines, property lines, ditches, trees and wooded areas are important factors. The growing period and the amount of care required by different tree species should also be considered.

For additional information on designing, planting and caring for windbreaks, contact a representative of your local conservation authority, the Ontario Ministry of Natural Resources, or the Ontario Ministry of Agriculture, Food and Rural Affairs.

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