WIND EROSION CONTROL

Severe losses can result from wind damage. In addition to the soil loss and resultant lowering of elevation, many crops are either totally destroyed or seriously injured during the early part of the growing season. Losses of one inch of soil and complete filling in of a drainage ditch from one storm have been observed. Fields left smooth after floating or light harrowing are especially prone to wind erosion. The great loss of soil is partially responsible for the "Nomad" type of farming in several of the organic soil areas (Figures 33, 34).

Injury to the growing crop may result from soil removal by exposing the seeds or roots; or from the abrasive action of the soil particles on the young plants. It is nearly impossible to completely prevent wind erosion on organic soils during severe wind storms.

Methods of Control

The following practices can be used to reduce wind erosion losses and damage to crops (163):

1. **Using irrigation water to keep soil moist.** Moist soils are not easily blown. Apply water from solid set systems before the surface soil dries and before the wind blows. Other systems are not well suited for this purpose.

Some producers regularly monitor the National Oceanic and Atmospheric Administration (NOAA) weather radio and when wind velocities are predicted to exceed 15 miles per hour, solid set irrigation systems are activated.

2. **Regulating water table height.** The ideal water control system on organic soil permits a progressive and controlled lowering of the water table in the growing season. Maintain a high water table until just before spring field operations. Where possible, lower water tables in the same sequence that fields are worked.

3. **Tree windbreaks.** This long-time wind control method has not been used extensively in recent years. Hardy evergreen trees on farm boundaries provide maximum year-round protection while the deciduous trees lose some effectiveness in the fall after their leaves drop.

Windbreaks should generally be two rows planted at right angles to the prevailing winds. Protecting from wind is effective over an area about ten times the tree height. Exercise care in choosing a species because some trees are better suited than others on specific soils. Also, roots can clog drainage tiles if the wrong species is planted.

While trees effectively reduce wind erosion, some vegetable producers report that in calm weather, especially with irrigation, they increase crop disease problems because vegetation dries slower. Also, with reduced air movement, frost and burnoff hazards increase when the soil surface is dry.

4. **Shrub windbreaks.** Using shrubs, such as spirea, instead of trees is appealing to some vegetable producers because they need less land surface. The protected areas are not as wide and more windbreaks are required.

5. **Small grains.** Small grains are planted in single or double rows and sometimes in drill widths (Figures 35, 36). Spring-planted small grains are much less effective than fall-planted. Some farmers have made special cutting devices to retard growth and cultivators to destroy the grain rows once the danger of wind erosion passes.

On some farms, the entire field is planted to rye and strips are left when plowing in the spring. The width of the strip for vegetable production is carefully measured to accommodate tillage, planting and harvesting equipment. Rye strips should be seven or more feet wide, while the cultivated strips vary depending on the wind erodibility. Most soils require widths less than 70 feet.

Where rye is left for seed, match the width of the strip with the width of the combine cutterbar. Some farmers use strips of fall planted rye and single rows of spring-seeded small grain between each vegetable row. This is relatively effective when used in combination with other soil conservation practices.

6. **Long, narrow fields perpendicular to prevailing winds.** Use this method in conjunction with other conservation practices. It is not a perfect solution because on occasion the wind blows at 90° from the direction of prevailing winds. In addition, tillage, planting and harvest directions in long, narrow fields are regulated by field shape.

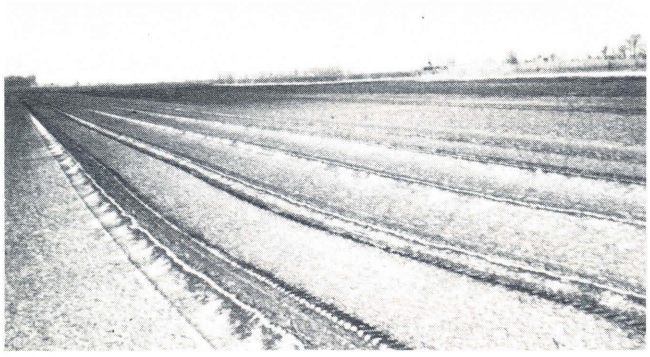

Figure 33. A sandy muck left smooth is vulnerable to serious wind erosion. Corrective measures need to be adopted.

Figure 34. Wind blown soil can cause a number of adverse effects—one is the filling in of drainage ditches.

Figure 35. Small grain plantings in fall or early spring before drilling the vegetable crop can reduce the wind erosion hazard.

Figure 36. Preemergence band spraying over mint row allowed oats on left to grow. Shortly the mint plants will have sufficient size to ward off wind erosion of the soil.

7. **Tillage directions at right angles to prevailing winds.** Most tillage implements create ridges which, when the wind blows at right angles, reduce soil movement by **saltation** (a movement where soil particles bounce one or two feet into the air and then back to hit the soil's surface) and by **surface creep**. This method is relatively ineffective when the wind blows at high velocities for extended periods.

8. **Ridging.** Ridging is an important consideration since fields with a smooth surface are easily eroded. Maximum protection occurs when the surface soil is ridged with tillage, planting and cultivating equipment perpendicular to prevailing winds. Ridges are easily leveled off by wind and are effective for only short periods unless they are rebuilt.

Seedbeds that are about three feet wide with seven-inch trenches are helpful for both wind erosion and excess water. These beds are formed during seeding and then lightly watered (Figures 37, 38).

9. **Strip-cropping perpendicular to prevailing winds.** Alternate strips of equal width of vegetable crops with small grains or corn. Maximum width is determined by kind of crop and size of tillage, planting and harvesting equipment.

10. **Primary tillage immediately before planting.** The best moisture level for tillage is also the best for planting; so ideally, tillage and planting should be done in the same operation or on the same day. Organic soils dry rapidly after tillage and erosion potentials increase.

11. **Spring minimum tillage methods.** Minimum tillage is the least tillage necessary for rapid seed germination, a good stand and high yields. Where root crops are grown on organic soils, the definition is expanded to include the production of well-shaped roots. Minimum tillage is important on organic soils containing relatively large amounts of mineral materials, especially marl. The larger the soil aggregate, the more it weighs and the less likely it will be moved by the wind. Residues from previous crops are effective if present in sufficient quantity.

12. **No-till methods.** No-till planting in a full stand of fall-planted rye represents a theoretically wind-proof environment. Unfortunately, details of planter design and approved herbicides have not been worked out. Methods for obtaining rapid seed germination, uniform stands and root shape and sizes need to be researched. Uniform planting depth of small-seeded crops and adequate seed-soil contact, even where rotary strip tillage was used, have been difficult to obtain. Nevertheless, this method of wind erosion control looks promising and may be used extensively for many crops.

13. **Single sweep shovel on cultivator.** A single sweep shovel produces excellent weed control between the rows while producing relatively large soil aggregates not easily moved by wind. In addition, small ridges form to effectively reduce wind action.

14. **Fall-planted cover crops.** Fall planted cover crops protect the soil during the critical winter and spring months. Rye, ryegrass, wheat, oats, barley and buckwheat have all been effective, providing that good fall growth is obtained. For crops that freeze during the winter, such as oats, residues retard soil drying in the spring by reducing evaporation rates. Incorporating cover crops into organic soil increases the fiber content and reduces wind erosion losses. Both cover and green manure crops improve aeration and soil structure when incorporated into older, finely divided organic soils. This is important in root crop production.

15. **Snow fences.** After planting a crop, some producers still use snow fences to protect the soil. These effectively reduce wind velocities, but labor and material are expensive. In the past when fields were small, crates and burlap fences set in the field served as similar control methods.