

economic loss in areas where erosion rates are below the soil loss tolerance (T) when the crops grown in that area are easily damaged by blowing soil (table 502–1).

502.11 The wind erosion process

The wind erosion process is complex. It involves detaching, transporting, sorting, abrading, avalanching, and depositing of soil particles. Turbulent winds blowing over erodible soils cause wind erosion. Field conditions conducive to erosion include:

- loose, dry, and finely granulated soil
- smooth soil surface that has little or no vegetation present
- sufficiently large area susceptible to erosion
- sufficient wind velocity to move soil

Winds are considered erosive when they reach 13 miles per hour at 1 foot above the ground or about 18 miles per hour at a 30 foot height. This is commonly referred to as the threshold wind velocity (Lyles and Krauss 1971). The WEPS model sets this threshold by the hourly conditions in the field. As the field or wind conditions change the threshold changes.

The wind transports single grain particles or stable aggregates, or both, in three ways (fig. 502–1):

Saltation—Individual particles/aggregates ranging from 0.1 to 0.5 millimeter in diameter lift off the surface at a 50- to 90-degree angle and follow distinct trajectories under the influence of air resistance and gravity. The particles/aggregates return to the surface at impact angles of 6 to 14 degrees from the horizontal. Whether they rebound or embed themselves, they initiate movement of other particles/aggregates to create the avalanching effect. Saltating particles are the abrading bullets that remove the protective soil crusts and clods. Most saltation occurs within 12 inches above the soil surface and typically, the length of a saltating particle trajectory is about 10 times the height. From 50 to 80 percent of total transport is by saltation.

Table 502–1 Crop tolerance to blowing soil

Tolerant T	Moderate tolerance 2 ton/a	Low tolerance 1 ton/a	Very low tolerance 0 to 0.5 ton/a
Barley	Alfalfa (mature)	Broccoli	Alfalfa seedlings
Buckwheat	Corn	Cabbage	Asparagus
Flax	Onions (>30 days)	Cotton	Cantaloupe
Grain Sorghum	Orchard crops	Cucumbers	Carrots
Millet	Soybeans	Garlic	Celery
Oats	Sunflowers	Green/snap beans	Eggplant
Rye	Sweet corn	Lima beans	Flowers
Wheat		Peanuts	Kiwi fruit
		Peas	Lettuce
		Potatoes	Muskmelons
		Sweet potatoes	Onion seedlings (<30 days)
		Tobacco	Peppers
			Spinach
			Squash
			Strawberries
			Sugar beets
			Table beets
			Tomatoes
			Watermelons