**Processes of Soil Formation**

Soil formation in dunes begins when plants become established and sand movement gradually ceases. Plant litter and dust (tiny particles typically less than 100 microns in diameter, 0.001 mm) begin to accumulate on the sand surface (Markus 1977; Danin & Kutiel 1997; Yaalon 1982). In the initial stage, a horizontal top layer of soil is formed in shades of gray to dark brown-gray, containing organic material from litter decomposition. This soil is called sandy Regosol, and it is associated mainly with fixed dunes. Regosol takes several years to form (Ravikovitz 1981). In many places along Israel’s coastal plain, where the soil profile is exposed to a depth of about two meters, one can find one or more dark layers of Regosol covered with new sand (Figure 9).

In the next stage of soil formation, eolianite ridges begin to appear in certain locations at depths of a meter or more. These ridges are formed due to the leaching of lime from shell fragments in the sand, which creates deposits deeper within the sand as rainwater infiltrates. This process takes thousands of years. This soil is still defined as sandy Regosol, accompanied by lime accumulations. In places where the top sand layer was removed due to human removal of vegetation, the eolianite ridge is exposed on the surface. Plants typical of lime-rich soils will grow there, including wild thyme and French lavendar. In places where neither the sand nor the vegetation have been removed, red soils develop that are devoid of lime and rich in clay minerals, which originate from aeolian dust that has settled in the area. These soils are known as Hamra soils. They are common along Israel’s coastal plain from Rosh HaNikra to Ashkelon, especially in the area between the Yarkon and Taninim rivers (Dan & Kutiel 1997; Dan et al. 2007).