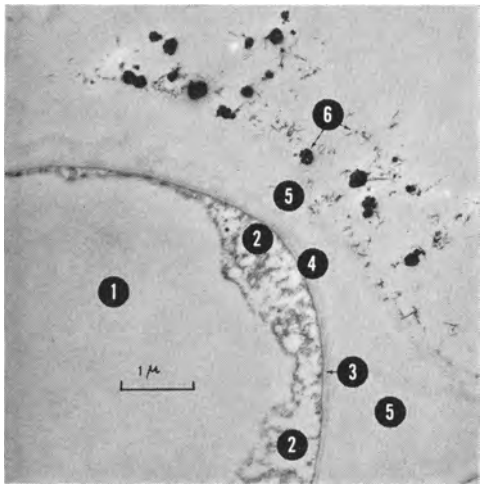
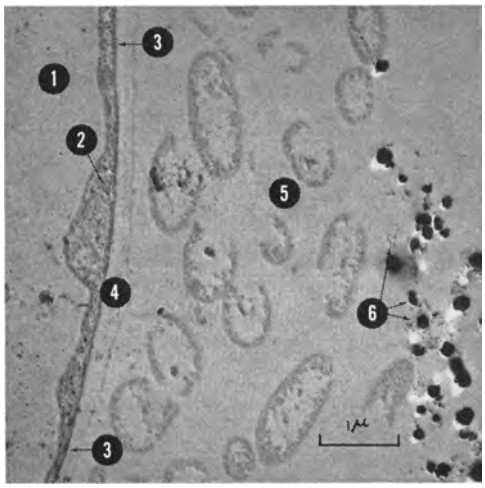
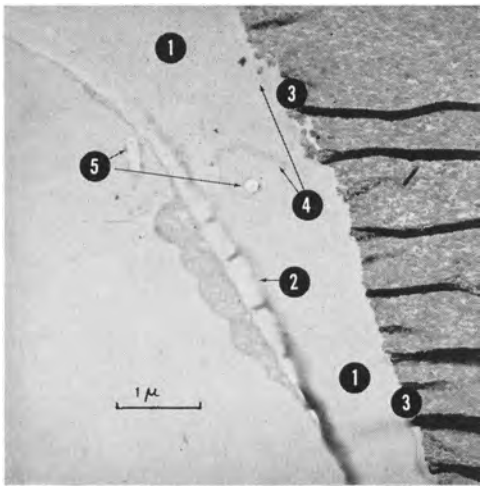


Left, magnified view of mucilaginous region at the root surface. From lower left to upper right corner: (**1**) large vacuole; (**2**) cytoplasm (dark stained); (**3**) plasma membrane (thin, dark line); (**4**) cell wall (grayish layer); (**5**) mucilage; and (**6**) black rods and larger aggregates of iran hydroxide particles in a large open macropore. One micron, as indicated by the bar on each micrograph, is equal to about 1/400,000th of an inch.



Right, view of rhizosphere; from left to right: (**1**) vacuole; (**2**) irregular band of cytoplasm (dark area); (**3**) plasma membrane (sharp, dark line); (**4**) cell wall (lighter uniform band with darker boundary line on right); (**5**) broad region of mucilage containing a colony of bacteria; (**6**) iron particles (black) as boundary markers.



Left, (**1**) boundary region between (**2**) cell wall (with dark cross bands) and (**3**) soil particle surface, filled with mucilage and containing outlines of (**4**) microbes. The white circle and ellipse (**5**) are holes in the film.

Right, shadow picture showing intimate junction of (**1**) mucigel and (**2**) soil particle surface with texture variation of the different areas. Separation at cell wall (**3**) occurred after the slice was made and shows the underlying carrier film for the sample.

Root-Soil Boundary Zones

As Seen by the Electron Microscope

THESE MICROGRAPHS show greatly enlarged views of the outer edges of root cells in contact with the soil. Of particular interest is the mucigel, a jelly-like coating on the outer surface of the roots. Mucigel, produced by the roots and perhaps also by microbes living in it, conforms to the surface contour of the soil particles it touches. Thus, intimate contact is provided for the transfer of soil nutrient ions and water from the soil to the roots.

To prepare specimens for these electron micrographs, barley seeds were grown in tubes filled with bentonite clay and permutite sand. The water content was adjusted to field capacity. After a few days the void spaces between soil particles were filled with liquid monomer, which hardens to a stone-like mass. Slices were then cut from these tubes with special diamond saws and knives. The slices used for these micrographs were between 100 and 500 angstrom units thick, roughly 1 to 2 millionths of an inch.

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