FURTHER STUDIES ON SOIL RESPIRATION

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Lundegardh defined soil respiration and proposed a method for its determination. The procedure consisted in placing a conical zinc bell over the soil and allowing the carbon dioxide to accumulate in it. The concentration of carbon dioxide in the bell was determined as soon as the bell was in position and again after a respiration period of 20 to 30 minutes. The amount of carbon dioxide evolved was then calculated. It is obvious that as the carbon dioxide accumulates in the bell the rate of diffusion will be retarded, due to the decrease in the pressure gradient between the concentration of carbon dioxide in the soil and that in the bell, the rate of decrease depending upon the size of the bell, the concentration of carbon dioxide in the soil, and the rate of its production. Lundegardh concluded, however, that the rate of diffusion was proportional to time, when the respiration period was not longer than 20 to 30 minutes.

Humfeld used a rectangular box placed over the soil, and in order to avoid decreasing the rate of diffusion by the accumulation of carbon dioxide under the box, swept air by aspiration over the soil surface.

Smith and Brown have recently concluded that respiration is not a simple diffusion of carbon dioxide through the soil and evolution at the surface, but that it is also a function of the diffusion velocity, adsorption, utilization, solution, and combination. The purpose of this paper is to present further data secured in the study of soil respiration.

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