It has been informally suggested that perhaps abnormal nitrogen assimilation of potted plants might be responsible for the lack of agreement of pot and field experiments in determining fertilizer requirements of soils.

It is the purpose of this paper to discuss added water data under three headings. First, to point out a possibility of conditions in pots conducive to abnormal assimilation; second, to describe briefly a rational moisture control of pots; and third, to suggest the use of added water data as a check on yields of dry matter.

The usual description of pot tests of fertilizer requirements of soils contains a statement to the effect that once or twice a week, water was added to bring the pots up to optimum moisture. Optimum moisture is often chosen to provide a moisture content at 50 per cent of the moisture required to saturate the soil.

An examination of added water data of the small pots of soil from North Dakota in a fertilizer trial in the greenhouse at Cornell University yielded the following information: In this trial, the pots were watered to optimum moisture content by actual weighing at stated intervals. Bear in mind that these pots were supposedly under identical growing conditions except for added fertilizer. On one particular day, Pot A contained 30 per cent moisture and Pot B, 19 per cent moisture. At the next watering, A contained 25 per cent moisture, while B contained 19 per cent. Ten days later, A contained 22 per cent moisture and B, 21 per cent moisture. In each case, Pot A contained more moisture than B. This discrepancy in moisture content existed although the pots were brought to weight at stated intervals. The soil of Pot A was maintained at a moisture level suitable for optimum conditions for oxidation and nitrification near the wilting coefficient. Such conditions permit unequal rates of nitrification in pots A and B.

A rational watering practice required that each pot should dry down approximately the same moisture content before it is watered to optimum moisture content regardless of lapsed time.

The essential data for comparable moisture content of pots are not difficult to obtain. Each empty pot is weighed, and the weight and moisture content of the soil in each pot is recorded. The weight of water to saturate a unit of soil is determined. The units of water and the percentage of water are the coordinates and abscissa, respectively. A straight line graph is constructed. With this graph, the approximate moisture content of the soil is known whenever the pot is weighed. For example, at optimum moisture, Pot A contained 34 per cent moisture. When the pot lost 25 grams water, the chart showed the moisture content of the soil in the pot to be 20 per cent. It is well to remember, the plants themselves are growing daily, therefore, exact moisture control necessitates correction for the actual weight of the growing plants. Hence the suggested moisture control is only approximate. Yet it will prevent wide soil moisture deviations in the pot test.

If provision is made to correct for water loss by evaporation, such as fallow pots, the data of added water can be utilized as a check on fertility. Arland (1), working in the University of Leipzig, advanced the idea that pots which produce the maximum dry matter per unit of water transpired, had received the most efficient soil management.

During three greenhouse seasons, Arland advanced the idea that pots which produce the maximum dry matter per unit of water transpired, had received the most efficient soil management.