

RESEARCH

USDA Scientists Find Answer to Phosphate Mystery

Blocking of phosphate ions at the plant root surface by hydroxyl ions is the explanation offered by USDA scientists to the problem of why alkaline soils often have higher phosphate requirements than do acid soils. Experience has shown that a crop requiring as much as 300 pounds per acre of available phosphorus, when grown in alkaline soil, may do just as well with only 25 pounds on an acid soil.

C. E. Hagen and H. T. Hopkins at USDA's Beltsville, Md., experiment station grew barley in nutrient solutions and measured phosphorus uptake. With an extremely acid solution (pH 4), phosphorus uptake was high. Uping pH to 6, they found phosphate ion uptake dropped 11%. At a neutral level, phosphate uptake declined to 74%, and when the solution was a mild alkaline (at pH 7.7), phosphate uptake was 85% below than in the extremely acid solution.

Hagen and Hopkins also report that two forms of soluble phosphate

—monohydrogen phosphate ions and dihydrogen phosphate ions—can be absorbed by plant roots. Some plants need only dihydrogen phosphate, some need both. The greater the soil alkalinity, the greater the breakdown of complex forms of phosphate and the more one-hydrogen phosphate ions present. When the soil is moderately acid, soil phosphate ions aren't broken down so far and the number of two-hydrogen phosphates exceeds that of the one-hydrogen phosphate ions.

Plants treat the dihydrogen form and the monohydrogen form as separate groups, permitting neither to use any part of the other's entry quota. The hydroxyl ion competes, according to the USDA researchers, with both phosphates.

Pyrethrum Laboratory Opens in Kenya

The Pyrethrum Board of Kenya, a producer's association, has announced opening of a \$100,000 research laboratory at Nakuru, Kenya. The laboratory is to be devoted to seeking the answers to such questions as: what breeding means can be used to increase pyrethrin content of the

flowers; how can flower volume be increased with full preservation of pyrethrin content, and how can the breeding of new strains be used to improve the biological activity of the plant.

BUSINESS AND FINANCE

Stauffer Earnings Up 33%

Preliminary unaudited earnings of \$12,305,000, or \$4.04 per share for 1955 are announced today by Stauffer Chemical. This represents an increase of 33% over 1954 earnings of \$9,210,000, or \$3.02 per share. Sales for 1955 were reported at \$145,490,000, up 24% from 1954 sales of \$116,916,000. These figures include earnings and sales of Consolidated Chemical Industries which was merged with Stauffer in last November.

Michigan Chemical Shows \$340,000 Profit for 1955

Michigan Chemical Co. reports a profit of \$341,314 for 1955, or 64 cents a share. In 1954, the company showed a net loss of \$228,894 or 43 cents a share. Of the 1955 profit, 19 cents a share came for nonrecurring income resulting from the sale of property.

Sales totaled \$6,526,275 for the year, a 12% increase over the 1954 sales of \$5,829,342.

Monsanto's Sales at \$522 Million

Monsanto Chemical's sales including those of Lion Oil, for 1955 amounted to \$522,349,097.

Unaudited net income for the year 1955 was \$42,169,970 which is equivalent, after preferred dividends, to \$1.98 a common share.

Earnings for 1955 were not strictly comparable with those for 1954 because the merger with Lion Oil Company made advisable some accounting procedure changes.

Hercules Sales Gain 21%

Hercules Powder's 1955 report to stockholders shows a 21% increase in sales and an increase of 34% in net income.

Net sales and operating revenues in 1955 amounted to \$226,651,058, an all-time high, compared with \$187,547,566 in the preceding year.

Net income after all charges was \$19,012,125, equal to \$6.90 a share of common stock. This compares

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