POTASH fertilizer investigations during the past four decades have included many Oregon soil types in laboratory and greenhouse studies. Positive response to potash has been followed by field trials, checked by tests of leaf composition, available soil potash, and recuperative characteristics of native soils.

During the past decade a grant-in-aid has helped secure an inventory of soil potash supplies in major soil series and its relation to yield, quality, and composition of indicator crops. This has led to preparation of a preliminary soil potash availability map of the State and tentative standards of adequacy for several indicator crops. The information accumulated is summarized to present the present status of our knowledge of potash needs of Oregon soils.

HISTORICAL

Previous reports of potash studies with Oregon soils have shown that:

Potash released by sulfates is reabsorbed by heavy subsoils.

Gypsum or sulfur liberates potash in Deschutes sandy loam, while deep rooted crops lessen the loss by drainage.

Potash and nitrate are complementary nutrients.

Potash pays on Oregon peats.

Berry leaf scorch on old grain land can be corrected with potash.

Potash improves crop quality. Its addition when needed has increased length of flax straw, firmness and cooking quality of potatoes, size, yield, and firmness of cane fruits, menthol content of mint, and sugar content of prunes.

Furrow application proved to be the most effective method of application of needed potash fertilizer.

EXPERIMENTAL

COLLECTION AND PREPARATION OF SAMPLES

Soils were collected from experimental plots by making several borings a rod or more apart to a depth of 7 inches. These were mixed in a pail and 1-quart composite samples throughout the plot. The samples were dried at 70° C and ground in a Wiley mill.

METHOD OF ANALYSIS

Leaf analysis was by the method of Piper (p. 2).

Chemical determinations of available soil potash have been made by displacement with neutral ammonium acetate, precipitation as cobaltinitrite, and estimation with ammonium hexanitrato cerate and sodium oxalate titration. The characteristics of several soils studied have been given in previous reports.

INDICATOR CROPS USED

Indicator crops used in these studies include potatoes, alfalfa, fiber flax, mint, prunes, and cane fruits.

FIELD RESULTS

Replicated or long-time plot experiments and exploratory farm trials have led to a preliminary determination of potash needs of Oregon soils. Crop response to potash fertilizer has been in three groups of Oregon soils: (a) leached sandy loams, (b) acid peats, and (c) old podzolized peats with compact subsoils when used for furrow crops.

The data in Table 1 are summarized from experiments and are representative of the potential holds as a fertilizer in Oregon soil fertility. The data are divided in three divisions, one for each of the main areas that have given positive response to potash.

Peat soils of Willamette Valley and the lower river areas have given marked response to potash in the mint. The increase in mint hay, over a 5-year period, has ranged from 0.4 to 1.22 tons per acre. The menthol content of the mint oil appears to be increased in the potash-treated mint.

An increase of 22 to 52 bushels of potatoes were secured from use of 120 pounds of potassium chloride an acre. Moreover, the potatoes appeared to be firmed, and with a higher per cent of No. 1 grade.

The Powell and Olympic, also Amity series, are representative of long-cropped humid area soils.

The data in Table 1 show that the following crop response to potash fertilizer has been found in sandy soils: Deschutes sandy loam in central Oregon, Yakima gravelly sandy loam near Milton, and Powell and Olympic series. The past 3 years, potash variation trials have been conducted in triplicated, randomized plots with...