THE MAGNESIUM CONTENT OF GRASSES AND LEGUMES
AND THE RATIOS BETWEEN THIS ELEMENT AND THE TOTAL CALCIUM, PHOSPHORUS, AND NITROGEN
IN THESE PLANTS

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INFORMATION concerning the magnesium content of plants is very limited compared with the large amount of data that has been published on the chemical composition of various crops for many other common elements.

Latshaw and Miller (3) studied the composition of five corn plants and found that the average magnesium content of the stems, grain, cobs, and roots was 0.179%. Miller (4) showed that cowpeas, soybeans, and andropogons contained 0.50, 0.70, and 0.19% of magnesium, respectively.

In a report on the influence of magnesium deficiency on phosphorus absorption of soybeans, Willis, Piland, and Gay (5) found a negative correlation of -0.39 existing between CaO:MgO, and a positive correlation of 0.19 for MgO:P₂O₅ in these plants.

EXPERIMENTAL PROCEDURE

Composite samples of mature native grass were collected during 1930 to 1934, inclusive, from typical areas of native pasture land and from hay meadows grown on virgin soils in 35 counties of Oklahoma. The mature legumes were collected on the experiment station farms at Stillwater and Perkins, Oklahoma, at the time the plants were cut for hay.

The legume tops and roots were also collected on these farms each week when possible from April 1 to May 20, 1933. The roots of these plants were carefully removed from the soil by digging at the same time the tops were collected and washed several times with water to remove the soil.

The samples were dried at 105°C and were analyzed for total calcium, phosphorus, and nitrogen by official methods recommended by the Association of Official Agricultural Chemists. The filtrate was saved from the calcium determinations in each case and analyzed for total magnesium by Hibbard’s (2) titration method in which the precipitate of magnesium ammonium phosphate was dissolved in 1/10 N standard acid and back titrated with a standard sodium hydroxide solution until neutral to methyl red.

RESULTS

MAGNESIUM CONTENT OF GRASSES AND LEGUMES

The magnesium content of 162 samples of mature grasses and legumes were studied and the data recorded in Table 1. According to these data, the average magnesium content of 19 different species of