THE chemical composition of some forage grasses approaching maturity was reported in a previous paper. Later studies, reported here, involved the composition of the grasses harvested during the entire growing season under conditions simulating rotational grazing. Both investigations had similar aims: to study the grasses in pure stands rather than in mixtures, to note differences between species in respect to chemical composition, and to obtain information on the organic rather than on the mineral composition, especially of those constituents important in furnishing energy to ruminants.

Reports in the literature on the composition of grasses under a system of successive cutting are too numerous to review here. Many are concerned with the comparative composition of different species. In all such studies there were variations in the management of the crop, sometimes leading to differences in results and in conclusions. It is difficult to design an experiment to determine differences between species. The number of cuttings per year will vary both within and between species. Cuttings made on the same date may reflect differences in maturity of different species, maturity being considered from the standpoint of age of leaf tissue rather than that of gross anatomy. Also a fairly constant level of soil fertility must be maintained when successive harvests are removed.

This report deals with the composition of eight grass species cut successively from small plots at grazing heights. The grasses are those previously reported and common to the northeastern United States, Alta fescue, bromegrass, Kentucky bluegrass, orchardgrass, reed canarygrass, redtop, timothy, and tall oatgrass.

MATERIALS AND METHODS

Establishment and Management of Plots

Results of two years, 1950 and 1952, are reported here. The samples for 1950 were obtained from the same plots as those in 1948 and 1949. After the 1949 samplings, the plots were mowed uniformly and fertilized as described. On April 10, 1950, they received a complete fertilizer at a rate of 40 pounds each of nitrogen, phosphorus, and potash per acre. Three more applications of nitrogen, each at 40 pounds per acre, were made on June 6, July 12, and Sept. 6. These applications were made uniformly over the entire area and did not synchronize with the cutting of the plots, the dates of which varied with the species. These plots had become weedy and were now abandoned. On an adjoining area, new plots 4.5 by 8.5 feet were selected Sept. 7, 1950, in quadruplicate. They were managed like the others until the spring of 1952 when sampling began. In addition to the spring fertilization, nitrogen was applied during the season individually to each plot immediately after it was cut instead of being applied as it was in 1950. The amount of nitrogen added was approximately equal to that removed in the grass. Procedure tended to maintain any inequality of fertility among the plots, it was discontinued after June 20. The plots received the same amount of nitrogen per cutting. Ammonium nitrate applied by hand at a rate of 20 pounds of nitrogen per acre. A complete fertilizer was applied immediately after it was cut instead of being applied as it was in 1950. The amount of nitrogen added was approximately equal to that removed in the grass.

Weather Conditions Influencing Samples

Each species was cut when it had reached a height suitable for grazing. The height of the grass was measured before cutting. The average composition of each grass and for each year of 1950 and 1952 was calculated. Certain significant differences existed between the 2 years, both being higher in 1950 than in 1952. Since these differences are not constant the 2 years' results have been combined in the discussion.

Comparison of 1950 and 1952

The average composition of each grass and for each year of 1950 and 1952 was compared. Certain significant differences between the 2 years and are summarized in the points of differences were few and scattered. When combined, only cellulose and crude fiber were different in the 2 years, both being higher in 1952. Since these differences are not constant the 2 years' results have been combined in the discussion.