THE EFFECT OF FERTILIZER APPLICATIONS ON THE COMPOSITION OF PASTURE GRASSES

H. N. VInAll AND H. L. WILKINS

THE relative productiveness of pastures in different localities depends not alone on the quantity of herbage produced but also on its quality. This perhaps is a truism which needs no explanation or defense. The factors which determine the quality of pasturage, however, are not so well understood and may warrant some discussion. In the first place, the kind of plants which contribute the pasturage are important. A reasonable percentage of legumes in the herbage increases its nutritive value because legumes have a higher feeding value than grasses. There is also an apparent difference in the nutritive value of various grasses.

The second important factor which has an effect on the nutritive value of pasture herbage is the fertility of the soil. A grass or legume grown on a rich soil will produce herbage richer in all the elements necessary for the proper nutrition of animals than will that same grass grown on a poor soil. This brings us directly to the question of the effect of applications of commercial fertilizers on the composition of the plant, a subject which will be discussed later. The value of certain of the rarer elements in pasturage is indicated by studies which are being made of the relation of malnutrition in animals to deficiencies of such elements as iron and copper in the herbage. "Salt-sick" of range cattle in Florida, described by Becker, Neal, and Shealy(1), is a case in point. Cases of malnutrition due to phosphorus deficiencies have been reported in considerable number. These usually occur on pastures or ranges where the soil is deficient in available phosphorus or a soil in which the calcium-phosphorus ratio is unbalanced. In addition to these soil characteristics there is also a reported difference in the ability of plants to extract phosphorus from the soil.

But actual malnutrition effects from poor pastures are not the only features to be considered. There is also the other side of the picture which may be fully as important. That is the increased nutritive value of pasturage arising from the presence of these minerals in the soil. The superior livestock, especially race horses, produced on the bluegrass pastures of Kentucky may be explained in part, at least, by the high percentages of manganese, copper, cobalt, zinc, iron, and iodine found in bluegrass (6).

There is a third factor which has an effect on the nutritive value of pasturage, viz., the stage of maturity of the plants at the time they

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1Contribution from the Division of Forage Crops and Diseases, U. S. Dept. of Agriculture. The results from Beltsville, Md., were obtained in cooperation with the Bureau of Animal Industry, U. S. Dept. of Agriculture, the analyses in so far as the minerals are concerned being made by Dr. R. E. Davis, Assistant Biochemist of that Bureau. Also presented at the meeting of the Association of Southern Agricultural Workers, February 6, 1936, Jackson, Miss. Received for publication April 29, 1936.

2Senior Agronomist and Assistant Chemist, respectively.

3Figures in parenthesis refer to "Literature Cited", p. 568.