ACTIVITY OF NITRIFICATION PROCESSES IN THE FALL AND WINTER MONTHS

R. P. BARTHOLOMEW

Conservation of soil fertility is recognized as one of the main problems confronting southern farmers. Climatic conditions make it necessary to consider the possibility of fertility losses due to biological processes which may take place during most of the year. Bacterial activity during the periods in which no crops are grown in the soils could cause the production of nitrates which might be lost from the soil.

Due to the fact that the amount of nitrogen in most southern soils is small, it was thought that additional information on the question of the amount of nitrification taking place during the fall and winter months was desirable. The experiments were also planned to determine the usefulness of cover crops as a means of conserving available nitrogen in the soil.

PLAN OF EXPERIMENT

Analyses for nitrate nitrogen were made at intervals during the fall and winter months by Harper’s modification of the phenoldisulfonic acid method on soils from field plats at Fayetteville which had previously received different cultivation treatments. Several plats were seeded to cover crops and in the spring the material from measured areas was harvested and weighed. Total nitrogen determinations were made on this material by the modified Kjeldahl method to include nitrates in order to determine the amount of nitrogen taken up per acre by the cover crops.

It is generally accepted that bacterial activity begins in soils when the temperature is around 40°F. During the winter months at Fayetteville there are periods in which the minimum daily temperature is above 40°F, whereas the maximum daily temperature may be considerably higher. The nature of these changes can be seen from the data presented in Table 1.

The data show that these warm periods may come at any time during the winter for the data represents three 8-day periods occurring in different months in different years. The number and

1Contribution from the Department of Agronomy, Arkansas Agricultural Experiment Station, Fayetteville, Ark. Research Paper No. 282 Journal Series, University of Arkansas. Received for publication October 5, 1931.

2Assistant Agronomist.


435