Continued production of profitable burley tobacco crops depends on how well the grower maintains the physical condition of his soils.

Greater PROFIT FROM BURLEY TOBACCO GROWN ON *Productive* SOIL

By HAROLD F. MILLER and IRA E. MASSIE

This vigorous grass-legume sod is ideal to precede tobacco.

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AGRICULTURE AND HOME ECONOMICS

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A well-fertilized sod of a deep-rooted grass and legume, when turned under, results in an easily crumbled soil, readily penetrated by tobacco roots. Such a soil furnishes a large reservoir for water and results in a rapidly-growing, early-maturing, high-yielding tobacco that is highly satisfactory to the manufacurers.

Heavy fertilization of tobacco land year after year has increased income over growing burley tobacco on old, depleted sod land. However, continuous tobacco frequently results in deteriorated soil structure, increased danger of manganese toxicity, and increased losses from such diseases as black root rot and black shank. Long continuous culture of the same land for tobacco tends to lower yields and produce lower quality leaf with harsh smoking characteristics.

You should not contrast yields obtained under continuous culture to those obtained on unfertilized, worn-out sod land. Rather, you should find out what tobacco will do following a well-fertilized sod.

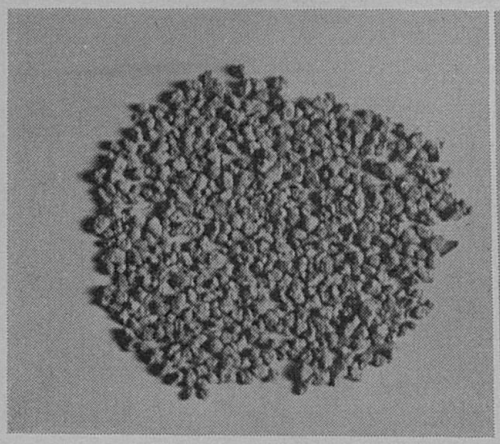
The purpose of this publication is to show the importance of maintaining good physical properties in tobacco soils as a means of insuring the continued production of profitable burley crops.

IMPORTANCE OF PHYSICAL PROPERTIES

Fertilizers alone will not insure maximum profits from your tobacco crop. Besides having plenty of available plant nutrients, your soil must have good physical properties if highest returns are to be obtained.

It is desirable that sand, silt, clay and organic particles in your soil be combined into units called aggregates. If these particles remain together when wet they are said to be water stable and the soil remains porous, allowing water and air to move through the soil readily. The grouping of the individual soil par-

ticles into aggregates forms secondary soil particles like those shown in Fig. 1-A. If these soil units are not water stable, they separate into individual grains of sand, silt, and clay when wet and appear like the material in Fig. 1-B. The fine clay and silt particles will seal off the openings to movement of water and air.



(Left) Fig. 1-A.— Units of soil material consisting of sand, soil, clay and organic particles. These units are called aggregates, and make the soil more permeable to water and air.

(Right) Fig. 1-B.— Same soil as shown in Fig. 1-A with the aggregates broken down into the sand, silt, and clay fractions slows down the movement of water and air in the soil.

Under these conditions much of the water will run off instead of going into the soil to be used by plants.

Most of the dry matter of a plant is made up of three elements—carbon, hydrogen, and oxygen. These elements are obtained from the air and water. The air is taken in through the leaves, but the roots must also have air or the plant will die. The water used by the plants comes from the soil. In the ideal tobacco soil, air and water move readily. When dry, the soil rapidly absorbs water from rainfall. When the soil is saturated, water gradually moves out and lets air enter.

HOW TO IMPROVE PHYSICAL CONDITIONS OF YOUR SOIL

Poor soil structure cannot be corrected rapidly. On eroded slopes where the top soil has been lost, many years of costly treatment are required to restore full productivity. More fertilizer is

needed on each crop to produce satisfactory yields. All this increases cost of production.

The most practical and economical method of maintaining or improving the physical condition of your soil is to grow good grass-legume sods. The fibrous root system of the grass will permeate the soil thoroughly, while the larger roots of the legume penetrate the soil profile to greater depth. When such sods are plowed under for tobacco, the old root systems die and add organic matter to the soil. The channels left in the soil as these old root systems decay aid in water and air movement during the growth of the tobacco crop. The return of farm manures and crop residues, control of erosion, and drainage where land tends to be wet help further to improve the physical condition of soils.

Since you can't rapidly improve the physical properties of soil, make your plans for your tobacco field at least three or four years in advance. Select the area and establish a good grass-legume sod with proper liming and fertilization practices on the pasture and hay crops.

Proper fertilization of the sod will, in addition to improving soil structure, increase the fertility of the soil and provide more feed for livestock. When a dense sod with an extensive root system, as shown in Figs. 2 and 3, is plowed ahead of tobacco,

Fig. 2.—A dense grass-legume sod improves physical properties of the soil.

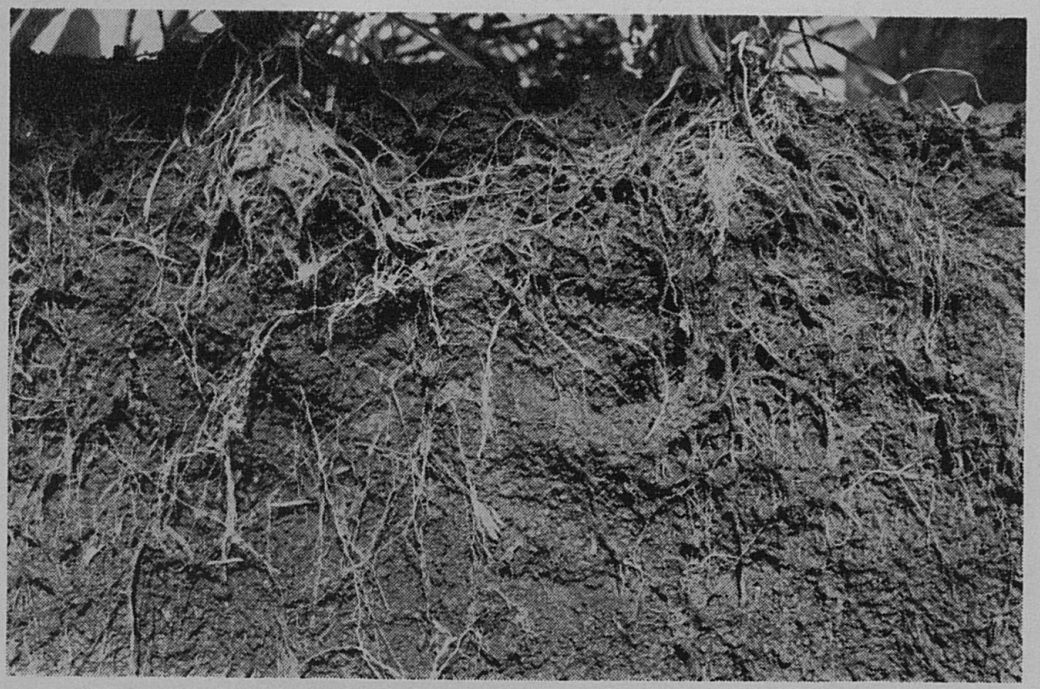


Fig. 3— A vigorously growing grass has an extensive root system.

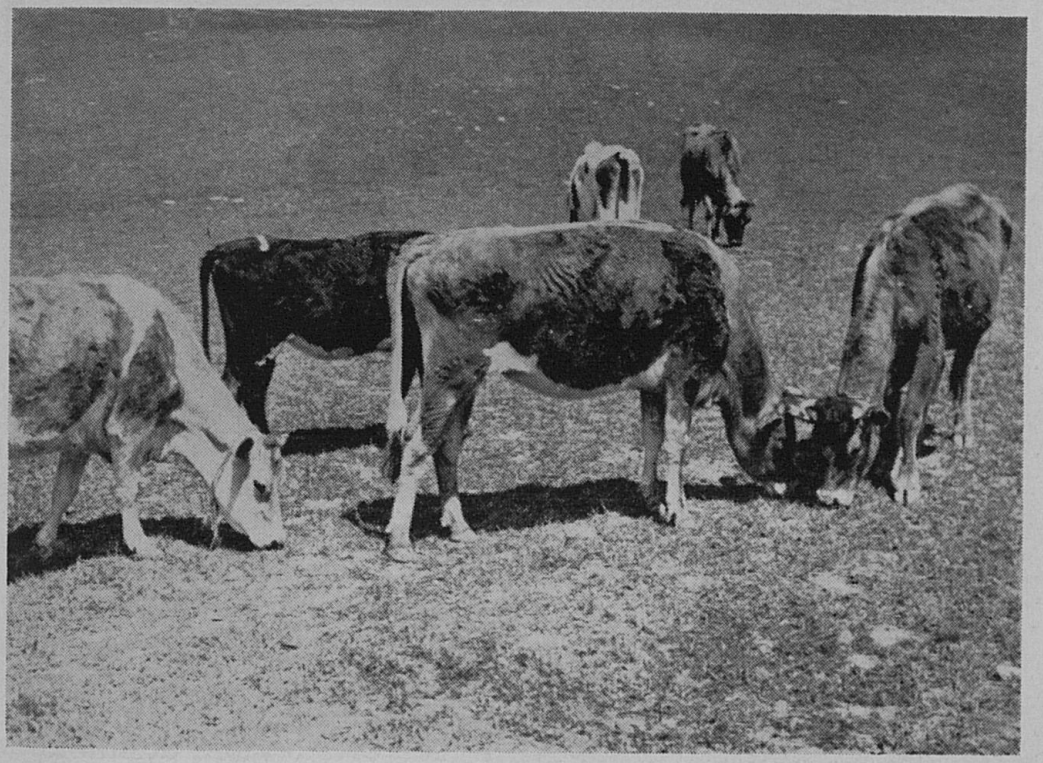


Fig. 4— Poor pasture is not a satisfactory crop to precede tobacco.

the soil will take up and hold water so essential to plant growth. Plan for two consecutive tobacco crops and a cover crop before returning it to a meadow field. Tobacco should not follow an unproductive pasture having a restricted root system as shown in Figs. 4 and 5.

Fig. 5.— Grass without proper fertilization does not have an extensive root system.

ADVANTAGES OF ROTATIONS FOR TOBACCO

- Structure of the soil is improved by growing a dense and vigorous grass-legume sod which has been properly managed and fertilized.
- There is less danger of a build-up of a soil-borne disease as shown in Fig. 6 when rotations are followed.
- The fertility level of more fields on the farm will be increased by proper fertilization of all crops in the rotation including tobacco.
- The hazard of erosion, as shown in Fig. 7, will be reduced since more water can get into the soil with less surface run-off.
- Tobacco produced following a good sod is more desirable in cigarettes than tobacco produced in continuous culture.

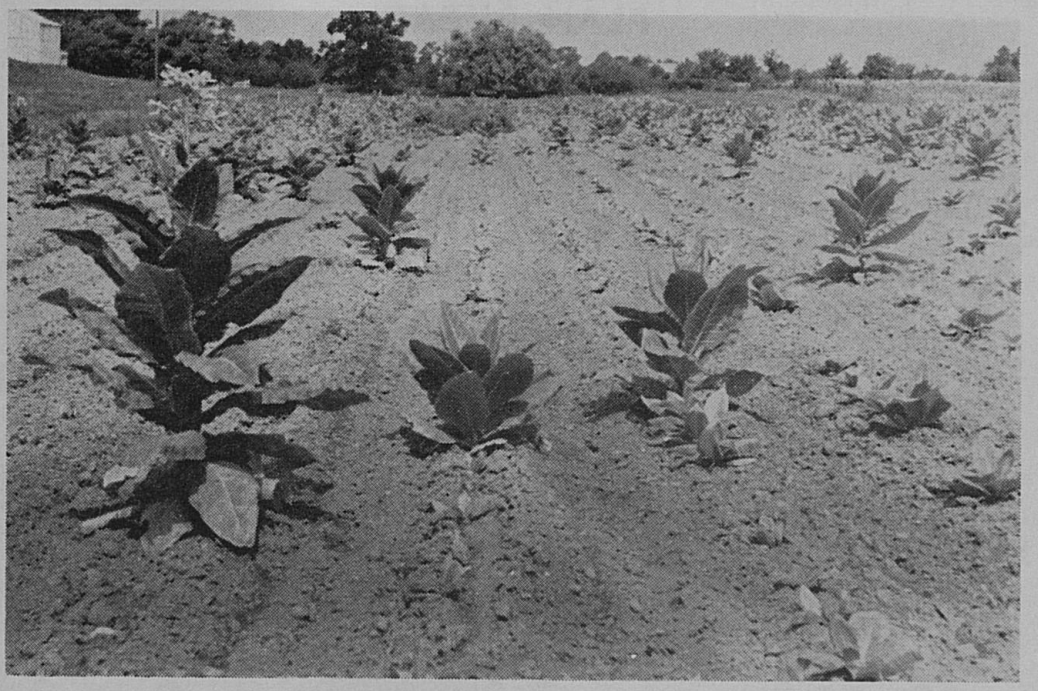


Fig. 6.— Tobacco grown on soil heavily infested with black root rot. This might have been prevented by rotation of sod with tobacco.

Fig. 7.— Productive top soil is lost by erosion. Prevent this by growing a grass-legume mixture that will produce a dense sod.

PLAN AHEAD

Prepare your fields for tobacco by proper fertilization and management of sod crops so a dense sod can be plowed before tobacco. Tobacco grown on productive soils will mean greater PROFITS for you.

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