

a great extent by a comparatively heavy application of phosphoric acid, which material tends to increase the growth, hasten maturity, and brighten the colour of the leaf, it would seem advisable on such soils always to have an excess of phosphoric acid.

We have found, at Harrow, that the form in which the different materials are supplied has a most important bearing on the quality of the leaf. Potash should be applied only in the form of sulphate of potash, as other forms of potash generally contain chlorine, which element tends to cause the production of a chaffy leaf of poor burning quality. The ammonia should be derived from some quickly available source, such as sulphate of ammonia, nitrate of soda, or dried blood (preferably the first two). If supplied by some material such as cotton seed meal, which gives up its ammonia very slowly, the tendency is to prolong the growth of the tobacco and thereby prevent it maturing early and ripening up yellow in the field.

In determining the right quantity of each of these materials to use no fixed rule can be applied; as the fertility of the soil and the effect of previous crops on the soil must be taken into consideration. The results of experiments, on the Station, indicate that an ideal fertilizer for the growth of flue-cured tobacco would be one in which the ammonia is present in such form and quantity that it would cause the tobacco to make a rapid maximum growth and would become practically exhausted when this growth had been attained, thereby giving the tobacco a better chance to ripen up yellow and uniformly.

The results of three years' experiments on the Harrow Tobacco Station, where the soil is representative of the heavier types used for the production of flue-cured tobacco, have shown that while potash is the limiting factor, on that soil, in growing tobacco, in most cases a complete fertilizer is needed to secure the maximum yield and the best quality. That is, the soil is more deficient in potash than in either of the other two materials. In some of these experiments tobacco stem ashes (in a quantity sufficient to give the equivalent of potash derived from the sulphate of potash) were used and the results indicated that the ashes were as good as sulphate of potash in producing tobacco; at least, so far as the yield was concerned. The stems might be used without burning and some ammonia as well as potash derived from them. In the latter case, the ammonia furnished by the stems should be taken into consideration in fertilizing.

These results also indicate that for both yield and quality, on the heavier soils, the following mixture is best:—

Sulphate of ammonia	140 lb. per acre.
Acid phosphate	500 " "
Sulphate of potash	200 " "

This gives a total of 840 pounds of fertilizer per acre. However, the plant food contained in that 840 pounds is approximately equivalent to the plant food derived from 1,100 pounds of a ready mixed fertilizer with an analysis of 3 per cent ammonia, 8 per cent phosphoric acid and 9 per cent potash.

LIMING SOILS FOR FLUE-CURED TOBACCO.

Practically all soils contain enough lime for the direct requirements of tobacco; and if used at all, the value of the lime will depend upon its action as an indirect fertilizer.

On many soils an application of lime will result in an increased yield; however, in many cases the quality of the tobacco will be impaired. On fairly fertile soils, with a good supply of humus, the use of lime generally results in the production of a coarser, heavier bodied leaf which does not cure with the most satisfactory results. This is due to the effect of the lime in causing a more rapid decay of the vegetable matter in the soil, thereby resulting in an increased food supply, which may be largely ammonia and which has the same effect on the quality of the tobacco as an excessive application of ammonia in the fertilizer would have.