

Fertility of Sod Land

LYMAN CARRIER

The question is sometimes raised as to what extent the producing power of a soil is reduced by the continual growing of grass on putting-greens. To put it in a commonly expressed term, does the growing of turf on putting-greens deplete the fertility of the soil, fertility being taken to include all of the factors of a soil involved in the production of plants? We have some unpublished data obtained several years ago at the Virginia Agricultural Experiment Station in connection with a grazing experiment which have a direct bearing on that question.

A series of 1/50-acre plats in an old bluegrass pasture which had not been plowed for years was fenced, staked off, and kept cut with a lawn mower equipped with a basket attachment to collect the clippings. The experiment was started in 1908; but owing to lack of care in drying the first clippings of grass that year's results were not complete. The plats were mowed regularly however during that season, and our observations led us to believe that the yields were higher than those of following years. There was one plat which was clipped every week, three every ten days, two every twenty days, one once a month, and one once a year, during the growing season. Some of the plats were harrowed, a disk and a spike-toothed harrow being used. Our observations, confirmed by the figures obtained on both these harrowed plats and on larger fields treated in the same manner but which were grazed by animals, were to the effect that no benefit resulted to the grass from the harrowing, and that harm could be easily done if the harrowing was severe. No fertilizing or artificial watering was attempted. The sod was composed of a mixture of plants, Kentucky bluegrass, redtop and white clover predominating. The height of the grass after mowing would correspond to that ordinarily found on fairways.

The following table gives the results, summarized by years, obtained in this experiment and computed on an acre basis. The green weights of the grass were taken, but they fluctuated to such an extent, depending on the weather conditions, that it was found to be more satisfactory to bring all the clippings to an air-dry basis under cover before weighing. The air-dry weights are the only ones given:

Year	WEIGHT OF AIR-DRY GRASS IN POUNDS PER ACRE				
	<i>Cut every 7 days; 1 plat</i>	<i>Cut every 10 days; average 3 plats</i>	<i>Cut every 20 days; average 2 plats</i>	<i>Cut every 30 days 1 plat</i>	<i>Cut once a year; 1 plat</i>
1909.....	2111	2075	2156	2437	3363
1910.....	1512	1917	1744	1975	2600
1911.....	845	870	817	1128	1850
1912.....	1098	818	1030	1382	2050
1913.....	906	917	864	875	1525

The season of 1911 was dry and very poor for grass, which accounts for the decided drop in yield that year. But the last two years were equally as good as the first two, judging from the gains made by the cattle in the adjoining fields. These figures show that cutting grass with a lawn mower, where the clippings are all removed, rapidly depletes the produc-

tivity of the soil. The nitrogen content of each mowing was determined and the results are significant. The nitrogen ranged from an average of 2.3 per cent in the grass from the most frequently mowed plat to 1.3 per cent in that from the one cut but once a year. The fine grasses practically all disappeared from the latter plat and their place was taken by coarse weeds.

After 1913 these plats were turned back into the pasture field and the ill effects from taking off all the material for six years without putting anything back to take its place was noticeable for several years. The results of this experiment show conclusively that the producing power of a soil is reduced where turf grasses are grown and the grass clippings removed, as happens in the case of putting-greens; and the common practice of top-dressing greens with compost and nitrogenous fertilizers appears to be based on sound principles.

Another experiment in connection with that pasture work may be worth mentioning. A tall coarse-growing grass commonly called broom-straw or broom-sedge (*Andropogon virginicus*), has been of late invading the bluegrass pastures of Virginia. It is highly objectionable from a grazing standpoint. As much of that land is too rough or steep to plow, any remedial measures taken must be such as could be applied directly to the sod. An evenly developed patch of broom-straw in an old pasture field was laid off in 1/10-acre plats, and a number of different fertilizers were applied in order to study their effects on the turf. Every fertilizer used except potash alone benefited the stand of bluegrass and tended to eradicate the broom-straw. Other experiments showed that that particular soil had plenty of potash and that it did not respond to additional applications. The most effective fertilizer and the one giving the most permanent results was acid phosphate, but that one greatly increased the stand of white clover. Nitrate of soda gave almost as good results the first year as the acid phosphate, and the increase in clover was not so noticeable. Ammonium sulfate was not used, as the clovers are an asset in a pasture. A top-dressing with stable manure and also an application of bone-meal made a marked improvement in the turf with a corresponding decrease in the stand of broom-straw.

The results of this experiment, which are confirmed by many observations and other experiments of a similar nature, show that the best and easiest method of controlling coarse-growing weeds is to have the soil sufficiently rich so that a dense turf of desirable plants is formed. Many weeds, like the broom-straw, indicate depleted soils; they will thrive under more adverse conditions than will the cultivated turf plants. But put the conditions right for the cultivated plants and the weeds will not be able to compete. Of course this does not apply to all weeds. Some will thrive (unless pulled out) no matter how dense the turf, but in general it is true that the more fertile the soil the fewer the weeds in the turf.

Plenty of sand and water in the tee-boxes.—This if attended to daily saves a world of growling.

Fertilizer from the woods.—Rake up the dead leaves in the woods at the end of winter and put them into compost piles.