walnut, but this trouble may be avoided by first applying orange shellac as described above. Another disadvantage of linseed oil paints is the difficulty of using them on surfaces where there is free moisture. They are not as satisfactory as the asphaltum preparations.

BORDEAUX PAINT is a homemade preparation made by mixing powdered Bordeaux mixture and raw linseed oil to the consistency of a thick paint. This material is assumed to possess disinfecting or fungicidal properties. Otherwise it appears to be like house paint.

For best results, wound dressings should be inspected at least once a year and repaired when necessary. Whatever the treatment used, no dressing can be considered to be permanent. Attention to maintenance will increase the effectiveness of all such efforts to protect and preserve valuable trees.

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Laboratory Methods For Evaluation of Putting Green Soil Mixtures

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The suitability of soil mixtures for putting green use may be evaluated by the determination of certain physical characteristics. These characteristics may be determined by laboratory procedures.

Inasmuch as some of the physical measurements will be affected by the degree of compaction to which the mixtures are subjected, it becomes necessary to outline standard methods of procedure in order that laboratory data may be interpreted properly.

The most useful information in evaluation of putting green soil mixtures comes from determinations of permeability (hydraulic conductivity) and pore space relationships. Information with respect to mechanical analysis, mineral derivation, aggregation, bulk density, and moisture retention characteristics is helpful but is most useful in its relation to the permeability and pore space considerations.

Methods of procedure have been worked out by Kunze (4) and Howard (3) in connection with investigations they carried out while pursuing graduate studies at Texas A. & M. College. For the most part these procedures are modifications of methods in standard use and which are fully described in the literature.

Permeability (Hydraulic conductivity)

The hydraulic conductivity of a soil is determined by the amount of non-capillary porosity of that soil and it is further affected by the size and continuity of the macropores. Because hydraulic conductivity is dependent upon the pore space relations within the soil, and because the noncapillary pore space is reduced by compaction, it becomes one of the most important measurements in the evaluation of a soil.

In preparing the sample, a copper cylinder three inches in length and two inches in diameter, open at both ends, is used. To the top of this cylinder is fixed a retaining ring of the same diameter and one inch in width. This ring is held on top of the cylinder by a broad rubber band such as may be cut from a bicycle inner tube. The other end of the cylinder is covered by a double thickness of cheese cloth and this is also held in place by a rubber band.

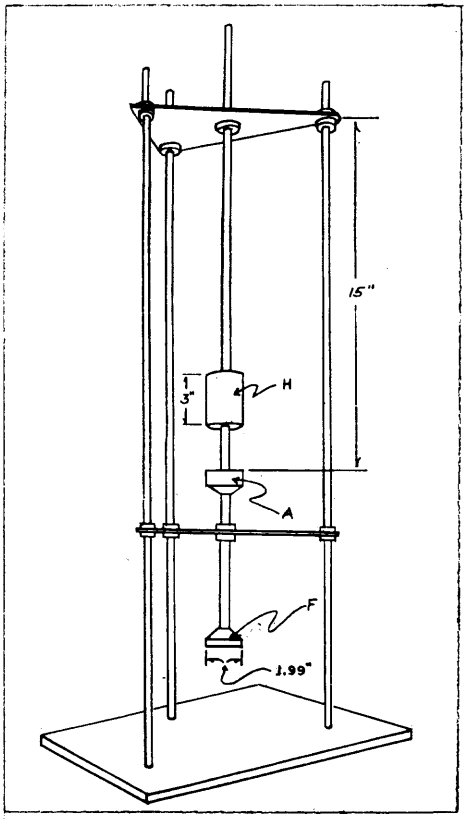
An air dry sample of a soil mixture is placed in the cylinder and settled by gentle tapping. Samples so prepared are placed in water and soaked for two hours to assure saturation. They are then transferred to a tension table. A tension of 40 cm. of water is imposed and samples remain on this table until they reach equilibrium.

It is assumed that samples which have reached equilibrium under this tension are at field capacity and that this is the stage at which compaction is capable of reaching its maximum. Samples are compacted with the impact type compactor shown in Figure I. A compactor of this type is fully described by Bruce (2). Fifteen drops of the weight (45 foot pounds of energy) have been found to produce a degree of compaction in laboratory samples comparable to that found in undisturbed cores taken from a compacted putting green.

After compaction, the one inch retainer ring is removed and the top of the compacted sample is trimmed smoothly to the level of the top of the cylinder. The compacted samples are replaced in water and soaked for 4 hours to insure saturation, weighed, and placed in the permeameter. The infiltration rate is measured with a ¼" hydraulic head. The permeameter must be so constructed that it will permit very accurate control of the hydraulic head for each sample. Figure 2 shows the type permeameter used.

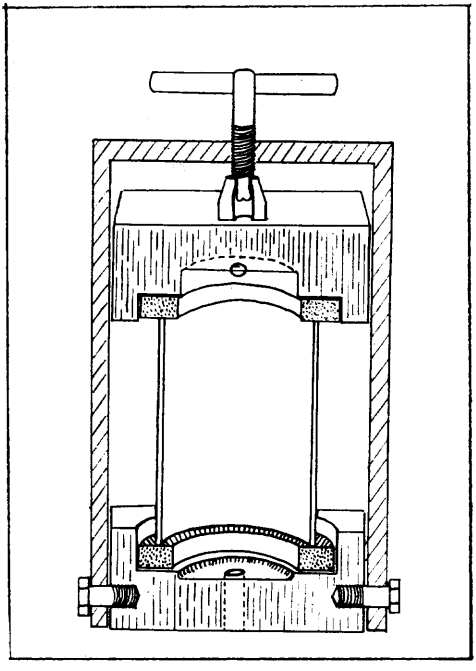
The sample is kept under a constant hydraulic head of ¼" for 24 hours. The amount of water passing through the sample is measured at certain intervals of time and the conductivity is calculated and reported in inches per hour.

Figure 1



An impact type compactor. The soil sample is placed under the foot (F) of a plunger. The hammer (H) which weighs 3 lbs. is dropped 15 times over a distance of one foot. Thus 3 foot lbs. of energy is applied to the anvil (A) and thence to the soil sample at each drop. It has been found that 15 drops of the hammer will produce a degree of compaction comparable to that found in a severely compacted putting green, provided the soil contains moisture approximating field capacity.

Figure 2



Cross section view of the type of permeameter unit used to determine the hydraulic conductivity of soil cores in the laboratory.

Porosity Determinations

When the sample is removed from the permeameter, it is again placed on the tension table at 40 cm. of water tension and allowed to come to equilibrium. The equilibrium or field capacity weight of the sample is recorded and the sample transferred to a pressure plate apparatus.

In the pressure plate apparatus, as described by Richards, et al (6) pressures of ½, ⅔ and one atmosphere are maintained and the equilibrium weight of the sample is recorded for each of these pressures. After making the one atmosphere measurement, the sample is transferred to a pressure membrane apparatus where 3, 6, and 15 atmosphere levels are measured and recorded. The pressure membrane apparatus is described in detail by Richards (5).

The sample is now oven-dried and weighed. Bulk density may be calculated by dividing the oven dry weight by the apparent volume of the sample.

Moisture Retention Characteristics

Capillary and noncapillary porosity measurements are made on a gravimetric basis. A tension or suction of 40 cm. of water is applied to saturated core samples. Water removed by this tension is considered to be that which occupies noncapillary pore space and that which is retained is considered to occupy capillary pore space. Baver (1, p. 269) states that a tension of 40 cm. gives the best agreement between percolation and porosity.

The calculation of pore space is as follows:

$$\frac{S - w}{V} = \text{percent noncapillary porosity,}$$

and

$$\frac{w - d}{V} = \text{percent capillary porosity}$$

When S = weight of sample when saturated with water,

w = weight of sample at equilibrium with 40 cm. of water tension,

d = weight of sample oven dry

and V = apparent volume of the sample.

Mechanical analysis, bulk density, degree of aggregation, and mineralogical information are derived through standard procedures which are described in the literature.

References

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Tips For Using Pesticides

1. Always read the label before using pesticide sprays or dusts. Note warnings and cautions each time before opening container. READ AND FOLLOW DIRECTIONS FOR USE.

2. Keep sprays and dusts away from children, pets and irresponsible people. Store pesticides in a secure place away from food and feed.

3. Don't smoke while spraying or dusting, and avoid inhaling sprays or dusts.

4. Do not spill sprays or dusts on the skin or clothing. If they are spilled, remove contaminated clothing and wash exposed skin areas thoroughly.

5. Use separate equipment for applying hormone-type herbicides to prevent accidental injury to susceptible plants.

6. Dispose of empty containers so that they pose no hazard to humans, animals or valuable plants.

If symptoms of illness occur during or shortly after spraying or dusting, call a physician or get the patient to a hospital immediately. Physicians now have available information for the quick and effective treatment of accidental overexposure to pesticides.

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