

plat will be ahead of the spring treated plat from the day the ground thaws. This condition is especially noticeable on the heavier soil types, which are commonly spoken of as cold or late soils, that is, soils which are slow in drying out in the spring. All soils, light or heavy, respond best to fall fertilization but it is most noticeable on the heavy types.

The reason for this quick reaction in the early spring of grass which has been fall-fertilized is due to the fact that fertilizer must have time to act. When applied in the late fall it is dissolved and carried into the soil by the fall rains so that by early spring it is down around the grass roots all ready for the grass to grab it and make a heavy green growth thereby. When fairway fertilization is delayed until spring the chemical must still be acted upon by the rains before it can get into the soil and be taken up by the grass roots. All this results in the loss of that early grass growth with the result that the heavy, green growth in the early spring is delayed.

In all probability many golf clubs fail to practice fertilization of the fairways in the fall due to the low condition of the club treasury at that period when the fiscal year is drawing to a close, whereas, on the contrary, flush condition of the exchequer in the early spring prompts the purchase of fertilizer at that time. It would be good business to reserve a certain amount of money at the beginning of the year for the purchase of fertilizer in the fall. Failing this I would even go to the extent of getting the stuff in the fall and trying to argue some one into taking a note due in three months.

Out of
LEACH'S
Mail-Bag

Tumble-Bug Treatment
Sir:

I am sending you some of the grubs found in our 17th green about a quarter of an inch ($\frac{1}{4}$) below the surface of the green where they seem to be feeding on the grass roots. Yellow spots were coming in the greens, especially the velvet bent was the first to be noticed.

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I notice the grubs are more plentiful in greens situated in a low spot with trees on one side or another where there is poor air circulation.

At what rate would you advise putting on arsenate of lead to eliminate this grub? I would appreciate any information as to its species and habits.—*J. M. (Pa.)*

Ans.:

The adult beetle is a ground beetle which feeds on other insects and is therefore of no consequence as regards injury to turf. The grubs in alcohol, unless I am sadly mistaken, are the grub or larvae of a species of so-called tumble-bug or dung beetle. I have submitted these to one of the systematists in the department for positive determination, but unless you hear from me to the contrary it is the tumble-bug type of grub.

These grubs are not very serious destroyers of turf but they are known to do some feeding on grass roots. In view of the fact that your turf is largely velvet bent, I would apply the lead arsenate at the rate of 2½ pounds per thousand square feet and watch results over a period of a couple of weeks. If this checks the damage, I would stop with this one application, but if damage continues, would apply another 2½ pounds at the end of this time.—*B. R. Leach.*

Applying Arsenate

Sir:

We are bothered this season with grubs which are working on the grass in fairways. We had good bluegrass fairways, but these grubs have ruined a lot of it. I have been told that arsenate of lead would do the work, mixed with water and sprayed on, but I do not know how strong to mix it. If you can give us any information on this we would appreciate it, and if you know of any other remedy that will do the work, we would be pleased to receive the same.—*L. A. (Ill.)*

Ans.:

I would not spray the arsenate of lead on the turf; it is better to mix it with a filler such as soil or organic fertilizer and apply same by broadcasting same with a lime spreader. For your information, I am enclosing a copy of our Circular No. 163 dealing with this question of lead arsenate applications to fine turf in which all these points brought out in your letter are fully dealt with.—*B. R. Leach.*