HOW TO KILL WEED SEEDS IN COMPOST

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Greenhouse Test No. 2:—This test was started March 2, 1942, using the same kind of materials but at slightly different rates of nitrogen, the same amount of seed, and the same kind of containers as in the previous test. The fertilizers were thoroughly mixed with the compost in each container, and the seeds were thoroughly mixed with the compost-fertilizer mixture of each container except for the bottom and top 2 inches. The containers were placed in cement beds 6x3 ft. and deep enough so that their tops were flush with the top of the beds. An insulating layer of peat moss was placed around the containers in order to eliminate heat condition between the mixtures. The average temperature in this greenhouse was 58° F.

Results of this test are shown in Table II. Temperatures of each container were taken daily. The maximum temperatures were recorded the seventh and eighth days. Milorganic at the rate of 5 lbs. of N. per cu. yd. gave a 24° rise, and a 14° increase with the 3 lb. rate; Agrinite at 3 lbs. gave an increase of 7°, and at 5 lbs. a 9° increase. Very little or no increase was recorded for Cyanamid, sulfate of ammonia and lime, or Chloropicrin.

The treated compost was transferred to flats, March 23. In order to note any remaining killing power of the materials, 2 fairly mature plants of Rhode Island bent that had a spread of about 4 inches were planted in each flat, March 27. Three days afterward, the plants on the 3 lb. rate of Cyanamid, 5 and 10 lb. rates of sulfate of ammonia and lime were flaccid, brownish and dead. On the 1 lb. mixture of Cyanamid, they were poor, but on the other were fair to good and remained so. Milorganite at the rate of 5 lbs. of N., Cyanamid at the 3.15 lb. nitrogen rate and the combined sulfate of ammonia and limestone gave very satisfactory kill of weed seeds. Chloropicrin at the rate of 1 lb. per cu. yd. apparently had no effect on killing clover seed but rather produced increased germination.

Tests in Wooden Bins in the Compost Shed:—These tests were started June 11, 1942. The materials used, rates of application, and results are given in Table III. Tests were run in duplicate in bins that held 3 cu. ft. After the fertilizer materials were thoroughly incorporated with the compost, 15 grams of weed seed, 7 grams of white Dutch clover and 3 grams of Rhode Island bent seed were mixed with the compost-fertilizer mixture and placed in the bins. Chloropicrin was added to certain bins at the rate of 1 lb. per cu. yd. Temperature readings were taken daily, and the maximum was reached on June 17 which was 6 days after treatments were applied.

A temperature of 104° F. resulted from the use of 5 lbs. of nitrogen from Agrinite

Table II—Compost Treatment, Materials and Rates of Application, Temperatures Obtained, and Results of Test as Shown by Amount of Grass, Clover, and Weeds Produced from Treated Compost. Greenhouse Test No. 2, 1942.[d]

Materials	Nitrogen per cu. yd. pounds	Material per cu. yd. pounds	Av. Maximum Temp. °F.[c]	Germination in flats Weeds %	Grass %	Clover %	Response of Bent Grass[a] Planted
Milorganite	3	50	72	55	19	2	good
"	5	83	83	0	1	1	poor
Agrinite	3	37	66	56	30	4	good
"	5	62	70	15	6	1	fair
Calcium Cyanamid	1.05	5	60	0	1	3	poor
" "	3.15	15	60	0	0	0	dead
Ammonium Sulfate	5	25[b]	60	0	1	0	dead
" "	10	50[b]	59	0	0	0	dead
Chloropicrin	0	1	59	3	72	140	good
Check	0	0	59	100	100	100	good

a. Treatment started March 2. b. An equal number of pounds of ground limestone added. c. Maximum temperature reached 7th and 8th days. d. Two bent grass plants planted in each flat March 227th, observations recorded March 30.

Table III—Compost Treatment, of Application of Materials and Results of Tests as Shown by Percentage of Control of Weed Seeds, Temperatures Obtained, and the Effect of Treated Compost on Putting Green Turf. Bin Test, 1942.

Materials	Nitrogen per cu. yd. pounds	Mat'l per cu. yd. lbs.	Max. Temp. June 17[e]	Per cent Control of Weeds	Per cent Control of Grasses	Per cent Control of Clovers	Color Increase on Bent Grass[d] Creeping	Color Increase on Bent Grass[d] Colonial
Milorganite	5	83	104	95	97	100	100	100
Agrinite	5	62	97	95	97	100	83	100
Calcium Cyanamid	1	5	76	98	99	96	50	57
" "	2	10	72	100	99	99	66	71
Ammonium Sulfate	5	25[a]	72	100	100	100	100	86
Chloropicrin	0	1	71	99	99	0	33	29
Check	0	0	71	0	0	0	33	29[b]
							0	0[c]

a. An equal number of pounds of ground limestone were added to help neutralize the acidity from the ammonium sulfat. b. Untreated compost. c. No compost. d. From application of treated compost applied to putting green turf as topdressing one month after treatment. e. Experiment started June 11, 1942.

generated a temperature of 97°, an increase of 26°, and slight increases in temperatures were recorded for the other fertilizer treatments but not for Chloropicrin. On July 14, samples of the treated compost were placed in flats and taken to the greenhouse. The per cent control of weed, grass, and clover seed of the variously treated lots are shown in Table III. All treatments gave at least 95% kill of weed seeds. The mixture of sulfate of ammonia and limestone gave perfect control of weed, grass and clover seed. Milorganic and Agrinite killed the clover seed. Cyanamid killed most of the clover but Chloropicrin did not seem to kill clover seed.

In order to determine if there would be any detrimental effect from the use of the variously treated composts on putting green turf, they were applied as topdressing at the rate of one-fifth cu. yd. per 1000 sq. ft. on July 14, a month after treatment, to plats of creeping bent, and Colonial bent. Within 3 days after the compost was applied, there was marked increase in growth and color. The compost treated with sulfate of ammonia gave the quickest response. Two weeks after the topdressing was applied, notes were taken on the increase in color. The percentage of increase is shown in Table III. It can be noted that all treated composts except with Chloropricrin gave considerable response when applied as topdressing. No available nitrogen in Chloropicrin could account for this. No harmful effects were observed from any of the applications.

Temperatures at 160° to 170° F. were obtained in compost piles consisting of 10 to 15 cu. yds. when mixed with Milorganite at the rate of 15 lbs. of N. per cu. yd. of compost during August and September of 1942. In the compost mixture where the nitrogenous fertilizer may create a high temperature there is a possibility of loss of ammonia, although no such loss was noted in any of these tests. Certain of the organic fertilizers generated such high temperatures in such a short time that it appears that these sources of nitrogen may be dangerous if applied alone in very large humid, rainy periods of July and August, quantities on turf especially during hot, or just prior thereto, and might possibly cause injury called "scald" of grass.

It appears that when nitrogenous fertilizers have the ability to create an extremely high temperature, with the help of bacteria, fungi, and moisture, that the temperature should not be allowed to exceed a point where any form of nitrogen might be lost or given off in the atmosphere.

Conclusions

The results of these experiments show that the method of killing undesirable weed seeds in compost by mixing the compost with certain fertilizers that contain nitrogen is of considerable value. It is practical as well as economical and will provide compost relatively free of viable weed seeds. Little or no increase in temperature occurred from the use of inorganic nitrogenous fertilizers such as Cyanamid, and ammonium sulfate and limestone. It appears that weed seed can be killed in compost with some of the fertilizers without generation of heat. It is also apparent that it is not the heat alone that does the damage to weed seeds.

Whether or not the compost-organic fertilizer mixture is covered with a canvas or

other material will make a difference in the amount of heat accumulated. The moisture content is undoubtedly a factor that should be considered and controlled when treatment with organic nitrogenous fertilizers is undertaken for the purpose of soil sterilization.

The method is both practical and economical from the greenkeepers standpoint because both sterilized compost and fertilizer may be applied as topdressing at the same time in one operation. This would save considerable of the time involved in making two separate applications of compost and fertilizer, especially during periods of labor shortage. This method would also have a tendency toward a more uniform distribution of fertilizer and, according to these tests, there was considerable benefit and no harmful effects on established turf when topdressd with compost treated with the various fertilizer materials used at the rates employed.

In view of the scarcity of inorganic nitrogen due to its demand for use in munitions during war times, it is imperative to substitute organic nitrogenous fertilizers. It is fortunate that they can be employed for the dual purpose of soil sterilization and fertilization.

DO IT NOW; THINGS MAY GET WORSE!

By HAL HERMAN

FORESIGHTED policy for a green committee is to work on the basis that things will get a lot worse before they get better, and to leave nothing undone to get all possible work done this summer and fall. It has been repeatedly proved that over-emphasis of the cost element of golf course work in wartime is seriously false economy. Putting off a job until financial conditions get better has meant that the job generally is delayed until it is impossible to get labor or materials for it. Clubs now find themselves with money to pay for work that can't be done. That development is an unusual thing in the past 25 to 30 years of American golf club history.

The one controlling element in determining what golf club work should be done now is whether or not it will retard war production work. If, in the judgment of the green committee, the golf club job will take labor or materials not under priority control, there is no license for the clubs to grab at the chance to get the work done, regardless of what other civilian enterprises may do under the same circumstances.

Club experiences with high school students' vacation labor has been spotty. Some of the youngsters are fine workers and learn quickly. Others have no desire to shine at earning their money. They stall and are apparently unable to do simple jobs satisfactorily. However, as war industry usually doesn't want to employ youngsters during the brief period of summer vacations and the farmers' experience with city and suburban high school student labor hasn't been notably satisfactory, there are many of these boys available for simple tasks at clubs.

Another source of labor for such jobs as golf clubs may be able to do in preparing against the eventuality of more serious labor and material shortages next year, is suggested by the USGA in its Green Section Turf Topics.

This suggestion is that partially disabled war veterans may be able to resume useful civilian lives by working for golf clubs. The clubs are advised to acquaint Veterans' Employment representatives in their areas with their labor requirements. Considerable of the golf club work would be outdoor and of a sort that could help rebuild the health and spirit of some young fellow battered by war.

However, in this connection, some believe that lawyer members of clubs ought to look into the matter of the veteran's legal status in connection with re-employment at the job he had before the war. These cautious people suspect there may be a chance of a veteran employed by a club for seasonal work sacrificing his rights under laws governing re-employment of veterans. Although we are of the opinion the Veterans' Employment representatives would bear that point prominently in mind, it's not a bad thing for the clubs to consider. No club in its desire to offer employment to a veteran—and in its desire to get its own work done—would want to take a chance