ZOYSIA SEED STORAGE AND GERMINATION TESTS

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THE propagation of Zoysia grasses in the United States has depended chiefly upon the use of vegetative material. This relatively expensive method has limited plantings of Zoysia to turf areas of high value. There are many more extensive and less valuable areas where Zoysia would make a desirable turf cover and where it would likely be used if costs were reduced.

Investigations by Ian Forbes, Jr., and Marvin H. Ferguson[1] have shown that suitable treatment of seeds produces satisfactory germination of seeds and that good stands can be obtained when seeds are planted in clean, well prepared seedbeds and given reasonable attention during the period of establishment. Inasmuch as some selections of Zoysia produce seed abundantly, it seems likely that in the future Zoysia turf may be established by the use of seed. It also appears likely that seed will be quite expensive until adequate domestic supplies have been developed.

These considerations led the USGA Green Section to undertake a study of the effect of storage conditions upon Zoysia seed in order that valuable seed would not be lost unnecessarily as a result of improper storage.

The purpose was to determine the optimum storage conditions for best germination of common *Zoysia japonica* seeds.

In the summer of 1949 common *Zoysia japonica* seed was harvested from plots at the Plant Industry Station, Beltsville, Md. The seeds were ripened, hulled, counted and stored under the following conditions:

A. In unsealed vials at temperatures of 5°C, 15°C, and 25°C.

B. In sealed vials at temperatures of 5°C, 15°C, and 25°C.

C. In sealed vials into which calcium chloride was placed—also stored at temperatures of 5°C, 15°C, and 25°C. Nine grams of $CaCl_2$ to one liter of space was used. It was found that vitality of the seeds could be lengthened materially by use of calcium chloride with seeds stored at the freezing point.[2]

Three replications of each test were stored under conditions indicated above. The experiment was designed to run eight years. Germination counts were made approximately every 60 days for the first year; every six months for the second year; and yearly thereafter. Five years' results are presented in this report.

In March, 1950, a sample lot of seed used for this test gave a germination of 82.33 per cent. Following are the results:

Treatment		Per Cent Germination — Average of Three Replications								
		4/10/50	7/10/50	11/20/50	2/1/51	6/11/51	10/2/51	7/29/52	2/2/53	2/1/55
5°C.	A.	81.3	76.3	81.0	75.6	70.0	68.1	12.6	48.3	12.6
	B.	78.0	78.0	75.6	75.3	73.0	71.0	13.3	32.0	13.6
	C.	80.3	75.7	79.0	73.3	69.0	67.3	14.3	25.3	15.0
15°C.	A.	75.0	60.3	64.6	38.3	13.0	12.0	00.7	00.3	00.0
	B.	76.0	72.7	77.6	30.0	70.0	55.0	43.3	33.3	18.0
	C.	76.0	75.0	74.6	76.3	70.7	47.0	38.3	37.0	14.3
25°C.	A.	79.6	73.0	77.0	67.0	60.0	52.7	22.3	24.0	01.3
	B.	77.3	70.7	84.6	72.3	61.0	49.0	35.3	33.3	06.3
	C.	74.6	70.0	82.3	69.6	63.7	61.0	26.0	35.0	20.0

A = unsealed vials.
B = vials sealed with paraffin.
C = $CaCl_2$ added befire sealing vials with paraffin.

Statistical analysis performed on the foregoing data indicates significance for all the following sources of variation: temperature, condition of storage, temperature x condition of storage, date counts made, and date counts made x temperature. The only source of variation that did not show significance was date counts made x condition of storage.

Seeds stored at 5° centrigrade held up slightly better than seeds stored at other temperatures. However, all seeds dropped considerably in germination in the third year of tests.

The greatest source of variation arose from the failure of the unsealed vials stored at 15° to hold up for as long as one year. This cannot be explained except to say that perhaps storage conditions were at fault. Other tests at 15° performed rather consistently except for the 2/1/51 sampling date of the sealed vials.

At the 25° temperature, only the seed stored with $CaCl_2$ compared favorably with samples stored at the lower temperatures after five years.

Under the conditions of storage set forth in this experiment, common *Zoysia japonica* seed reduces sharply in germination after two and one-half years.

[1] *Effects of Strain Differences,, Seed Treatment, and Planting Depth on Seed Germination of Zoysia Spp. Agronomy Journal* 40:8 (1948).
[2] *Verret; page 33 Growth of Plants" by William Crocker.*
Statistical analysis performed by Dr. E. J. Koch, U. S. Department of Agriculture, Beltsville, Md.

WHEN YOU BUILD A PUTTING GREEN MAKE SURE THE SOIL MIXTURE IS A GOOD ONE

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THERE are many factors one must consider in the building of a putting green. Among these are location, slope, exposure, design, contour, water outlets, soil mixture, type of grass, and many others. Probably no other factor is as important in building a putting green as is the soil mixture.

The soil mixture is important to the ultimate welfare of the putting green because it must be of such a nature that it will drain quickly, that it will resist compaction, and that it will be resilient enough to hold a properly played shot and yet not so spongy that it will hold a shot played poorly. The surface of the putting green should resist deep pitting when balls are played to it. Moisture content of the soil as well as the amount of turf present affects the type of putting that will occur.

The foregoing requirements of a putting green soil are peculiar requirements but in addition there are the basic requirements that any soil must provide to sup-