

A STUDY OF pH AND Ca CHANGES IN GREENHOUSE SOILS

G. F. Griffin, Extension Agronomist
R. W. Judd, Jr., Extension Horticulturist
E. Perkowski, student

Plant growers have been asking, "How long does it take lime to react once it is mixed with soil?" With this in mind, a study was undertaken to determine how fast ground agricultural limestone works. Four soil mixes containing equal parts of soil, vermiculite and sphagnum peat were used. Two rates of dolomitic limestone were used resulting in 8 treatments. They were:

- DC15 Soil, domestic vermiculite, Canadian peat,
15 lbs. of limestone/yd.
- DC30 Soil, domestic vermiculite, Canadian peat,
30 lbs. of limestone/yd.
- DG15 Soil, domestic vermiculite, German peat,
15 lbs. of limestone/yd.
- DG30 Soil, domestic vermiculite, German peat,
30 lbs. of limestone/yd.
- AC15 Soil, African vermiculite, Canadian peat,
15 lbs. of limestone/yd.
- AC30 Soil, African vermiculite, Canadian peat,
30 lbs. of limestone/yd.
- AG15 Soil, African vermiculite, German peat,
15 lbs. of limestone/yd.
- AG30 Soil, African vermiculite, German peat,
30 lbs. of limestone/yd.

Each treatment also received four pounds of superphosphate (0-20-0) per cubic yard. Tomato seedlings were planted into each treatment to permit testing of the mixes under growing conditions.

In addition, soil samples of the above treatments were stored dry, moist and wet. An initial large batch of moist mix was prepared by blending moist field soil with peat and vermiculite. A portion of this was stored immediately in airtight plastic bags. A second portion of the initial moist mix was air-dried in the greenhouse for three days before storing in plastic bags. This was the "dry" mix. A third portion of the moist mix was weighed and water, equal to half the soil weight, was added before storage. This was the "wet" mix.

Samples were analyzed (Spurway) at 0, 7, 15, 30 and 50 days.

Results:

1. The pH increased rapidly during the first seven days. (Figure 1)
2. African vermiculite resulted in higher final pH values after 50 days than domestic vermiculite. (Table 1)
3. Canadian peat did not result in higher final pH values than German peat. (Table 1)
4. Calcium soil test readings were variable and did not consistently reflect amounts of calcium added via the limestone treatments. (Table 2)

Table 1. Changes in pH of the various mixes at 0, 7 and 50 days after mixing with two rates of ground dolomitic agricultural limestone. The "0" days value represents the mix used in all other treatments. The average pH value for domestic vermiculite was 6.1, for African vermiculite 6.4, after 50 days.

Treatment	Treatment									
	Days	Dry	Moist	Wet	Planted	ment	Days	Dry	Moist	Wet
DC15	0		4.1			DC30	0		4.1	
	7	5.1	5.6	6.2	6.5		7	5.4	5.6	6.4
	50	5.5	5.0	6.3	6.8		50	6.1	5.7	6.7
DG15	0		3.9			DG30	0		3.9	
	7	5.2	5.4	5.9	6.6		7	5.9	5.4	6.1
	50	5.3	5.0	6.1	6.6		50	6.2	6.0	6.3
AC15	0		4.6			AC30	0		4.6	
	7	5.6	5.7	6.3	6.6		7	5.5	5.7	6.2
	50	5.9	5.7	6.7	6.9		50	6.0	5.5	6.9
AG15	0		4.6			AG30	0		4.6	
	7	5.4	5.7	6.2	6.4		7	5.7	6.1	6.4
	50	5.8	5.8	6.6	7.0		50	6.1	6.1	6.7
										6.9
										6.4

Table 2. Calcium levels at 7 and 50 days after treatment. Readings were not predictable and all fell within low to medium levels.

Treat- ment	Treat- ment						Days	Dry	Moist	Wet	Planted	Days	Dry	Moist	Wet	Planted
	Days	Dry	Moist	Wet	Planted	ment										
DC15	7	47	40	50	58	DC30	7	58	47	39	60	50	58	44	60	58
	50	49	39	43	51											
DG15	7	60	30	34	41	DG30	7	46	68	49	57	50	65	56	77	66
	50	44	46	63	56											
AC15	7	40	34	30	39	AC30	7	37	44	35	50	50	41	37	53	59
	50	44	41	54	55											
AG15	7	39	32	34	43	AG30	7	42	32	32	44	50	44	48	56	48
	50	37	36	54	50											

