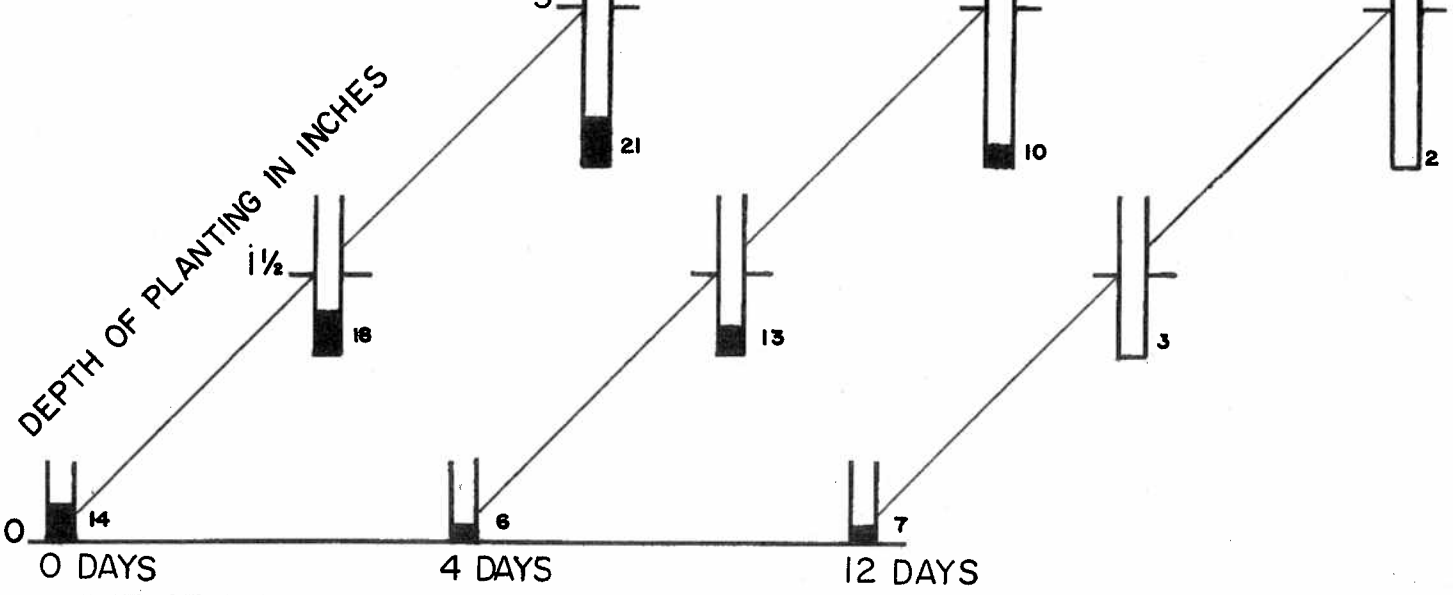
The Influence of Depth of Planting on Fusarium Stem Rot

by Ralph Baker

Many growers both here and abroad transplant carnation cuttings with the base of the cutting as close as possible to the surface of the soil. Such a practice, presumably, would lift much of the stem tissue away from pathogens which may be in the soil and allow better aeration around the root head. Further, wounds on the stem might be expected to heal more rapidly.

An experiment was set up to investigate the influence of depth of planting on the development of Fusarium stem rot. Rooted cuttings (variety Red Sim) were planted in flats. Three planting depths were used: bases of cuttings were set 3 inches below the surface of the soil, others were planted at a conventional depth of 1 to 1½ inches under the surface of the soil, and a third lot was planted so that the base of the cutting was no deeper than ½ inch below the surface. The last named transplants were tied to pot labels stuck alongside for support.

Separate blocks of rooted cuttings planted at the 3 depths were inoculated (5000 macroconidia/cc of soil) on the day of transplanting and at 4 and 12 days thereafter respectively. In all, 36 plants in 3 replications were inoculated at each of these times per planting depth.



Diagrammatic sketch of Fusarium stem rot development as it is affected by depth of planting. Height of lesions is shown in black. Top row of figures represents cuttings planted at a depth of 3 inches, second row planted 1-1½ inches, and third row planted 0-½ inches below the surface of the soil.

A study of the results as listed in Table I and the illustration indicated that when inoculation occurs immediately after transplanting the deeper the planting the longer the lesions. However, the plants with their bases nearest the surface of the soil were susceptible for a longer period after transplanting.

The full significance of these result must await other tests now in progress. Certainly, cuttings may be planted at excessive depths which could increase disease severity as measured by length of lesions. Conversely, if the stem is barely touching the surface soil, the length of lesions is reduced significantly. This is only true, however, when inoculation occurs on the day of transplanting or soon thereafter.

Table 1. Effect of depth of planting on Fusarium stem rot development.

Depth of planting in inches	Mean height of lesions in millimeters			
	Inoculated			
	Day of transplanting	4 days after transplanting	12 days after transplanting	Uninoculated Control
0-1/2	14	6	7	--
1-1 1/2	18	13	3	1
3	21	10	2	--

Minimum difference for significance with odds of 19-1 = 5

15-30-15?? *or Soluble Phosphorus Fertilizers*

Use of 15-30-15 liquid fertilizer has been recommended in our columns and elsewhere for general florist crops. A 15-30-15 feed means of course, 15% nitrogen, 30% phosphate, and 15% potash.

Ray Moore of Moore Laboratories, Buffalo, New York raises an interesting point of caution here in a recent letter. We quote:

"During the last year a considerable number of ranges have experimented with 1-2-1 (or 15-30-15) completely soluble fertilizers applied with their watering operation.

"The Laboratory has been much interested in these trials for the reason that soluble phosphates form insoluble compounds with calcium, magnesium, iron, manganese, and other elements essential to growth.

"In a Rose range with a sixteen year monthly average of 170 parts per million of calcium (Spurway) in a heavy soil the level of calcium dropped to 90 to 110 parts per million within three months, with constant use of a 1-2-1 soluble fertilizer. Iron and manganese deficiencies developed. After discontinuing its use, three months time was required to readjust the soil to its previous levels.

"In a Carnation range with a nine year monthly average of 120 parts per million of calcium in a light sandy soil, the calcium level dropped to 60 to 70 parts per million in two months. Slowing down of growth, poor leaf color and an indication of boron deficiency was present. Two months time was required to adjust the soil to its previous levels after discontinuing the soluble phosphate.

"Both calcium and magnesium deficiencies developed in a Mum range. Similar results were found in seven different ranges experimenting with a 1-2-1 soluble fertilizer.

"In each case, no increase in available phosphate was found indicating that the soluble phosphate combined with other elements in the soil and was rendered unavailable to the plants.

"Since the absorption of available elements by the plant is a rapid process, it is quite possible that the plants had ample time to absorb some phosphate before it was rendered unavailable. As a matter of fact, no identifiable phosphate deficiencies were noted in the time involved. Only a normal reduction in available phosphates occurred.

"These experiments do not necessarily mean that any use of soluble phosphate fertilizer materials will cause trouble. We know they are beneficial as starting solutions and that soluble 1-1-1 fertilizers have been used for pot plants and short time crops without visible damage occurring.

"We believe, however, that complications will arise from too frequent or continuous use of soluble phosphate fertilizers on greenhouse crops. This is especially true where the soil is sterilized for re-use.

"Soluble phosphate salts are expensive."

----Reprinted from Geo. J. Ball., Inc., "Growers Talks" May 1956.

Your editor,
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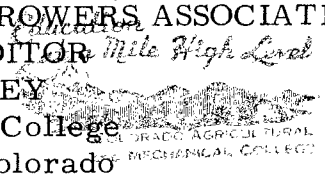

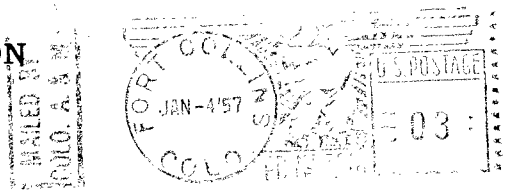

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