CHAPTER V

RESULTS AND DISCUSSION

Results are expressed in terms of half-residence time. Whereas half-residence time ($T_{1/2}$) is the length of time that it takes for half the activity in a compartment to be removed. Half-times for a given point within a compartment represent the empirically measured length of time that it took for the concentration at that point to fall by a factor of two.

V.1 Soil Samples

In Figure V-1 the tritium concentration (dpm/ml of soil water) in three depths, i.e. 0-5 cm, 5-15 cm and 15-25 cm in the cultivated soil is presented as a function of post application time of tritiated water. Tritium concentration in the surface soil (depth of 0-5 cm) decreases rapidly on the first 10 day period. After that decrease proceeds more slowly; while half-residence time is about 12.5 days. Rapid loss of tritium occurred post-exposure in the 0-5 cm stratum due to water vapour losses during the hottest time of the day. At the 5-15 cm depth, tritium concentration first increases for first 4 day period. When the

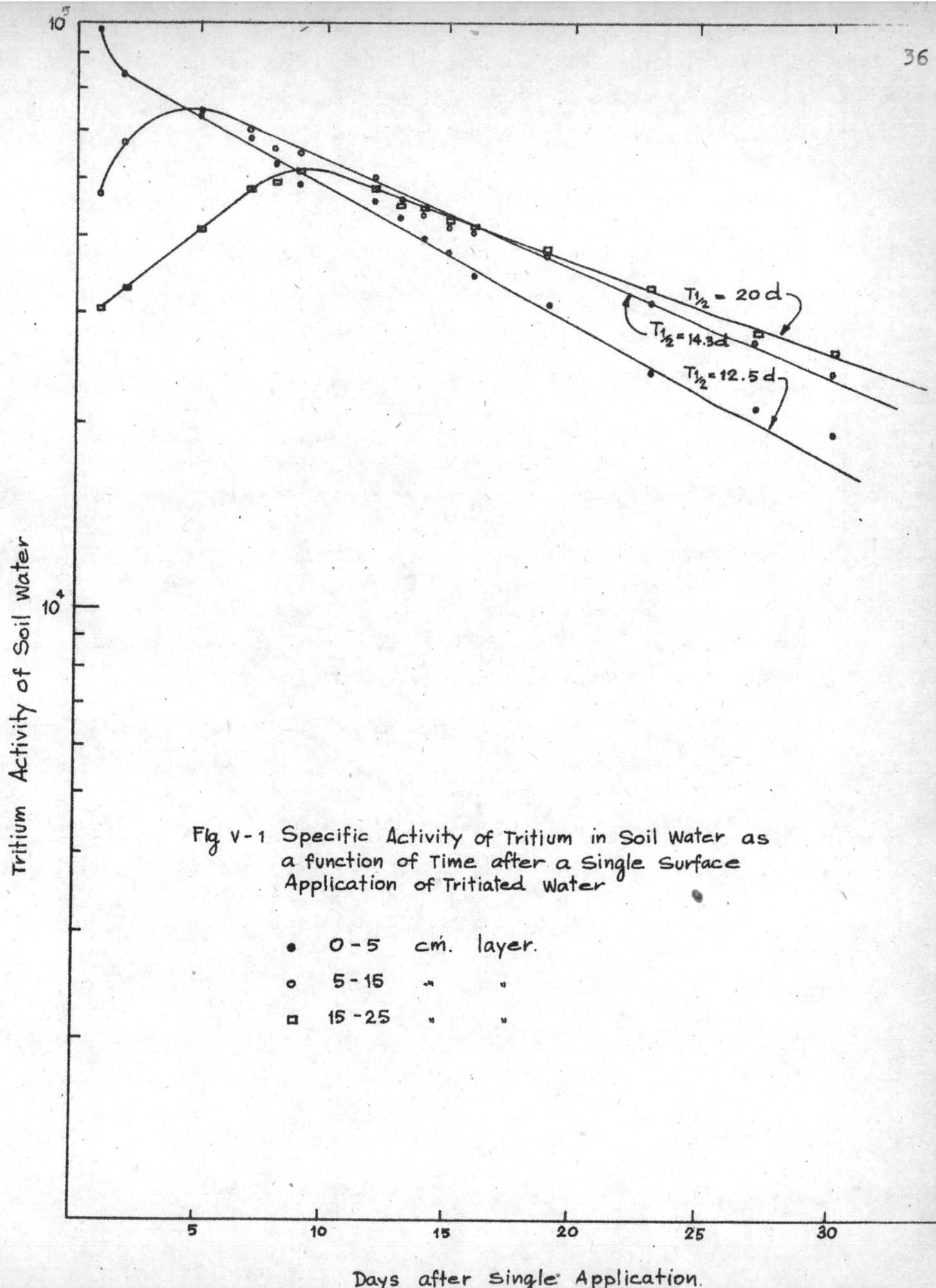


Fig V-1 Specific Activity of Tritium in Soil Water as a function of Time after a Single Surface Application of Tritiated Water

- ● 0 - 5 cm. layer.
- ○ 5 - 15 " "
- □ 15 - 25 " "

concentration is the same as in the surface layer, it begins to decrease with a half-residence time of about 14.3 days. A maximum tritium concentration at the depth of 15 to 25 cm is reached after 9 days of surface application, whereupon, slow reduction with a half-residence time of about 20 days takes place. In Figure V-2 is shown tritium activity of the soil water as a function of depth for selected days since the application of tritiated water. As for Figure V-3, it shows the total tritium concentration in the soil column as a function of time. It is found that the half-residence time of the soil water is of 21 days.

V.2 Vegetation Samples

Uptake and elimination of tritiated water in vegetation were followed on each experimental plot. Results from this determination are shown in Figure V-4 where the tritium concentration in tissue water are present as a function of time since surface application of tritiated water. The data shows that the maximum tritium concentration in most of the vegetation are reached in 8 to 9 days, whereas Asparagus bean and Radish reach the maximum tritium concentration in 15 days. After the maximum tritium concentration has been reached,

Fig V-2. Tritium Activity of Soil Water
as a function of Depth for a Selected Day

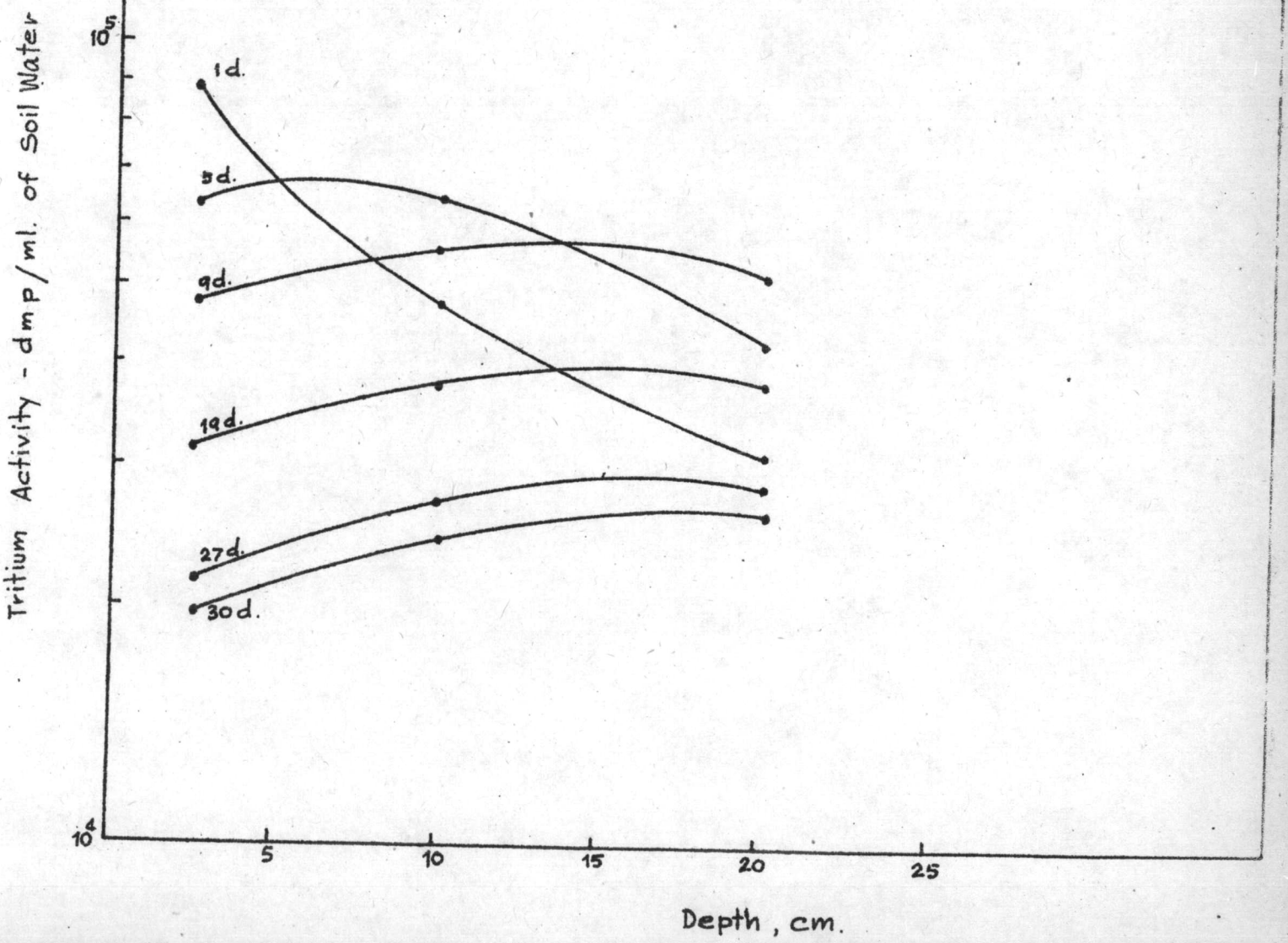


Fig. V-3 Total Tritium Activity in the Soil Column (from surface to the depth of 30 cm.) as a function of Time.

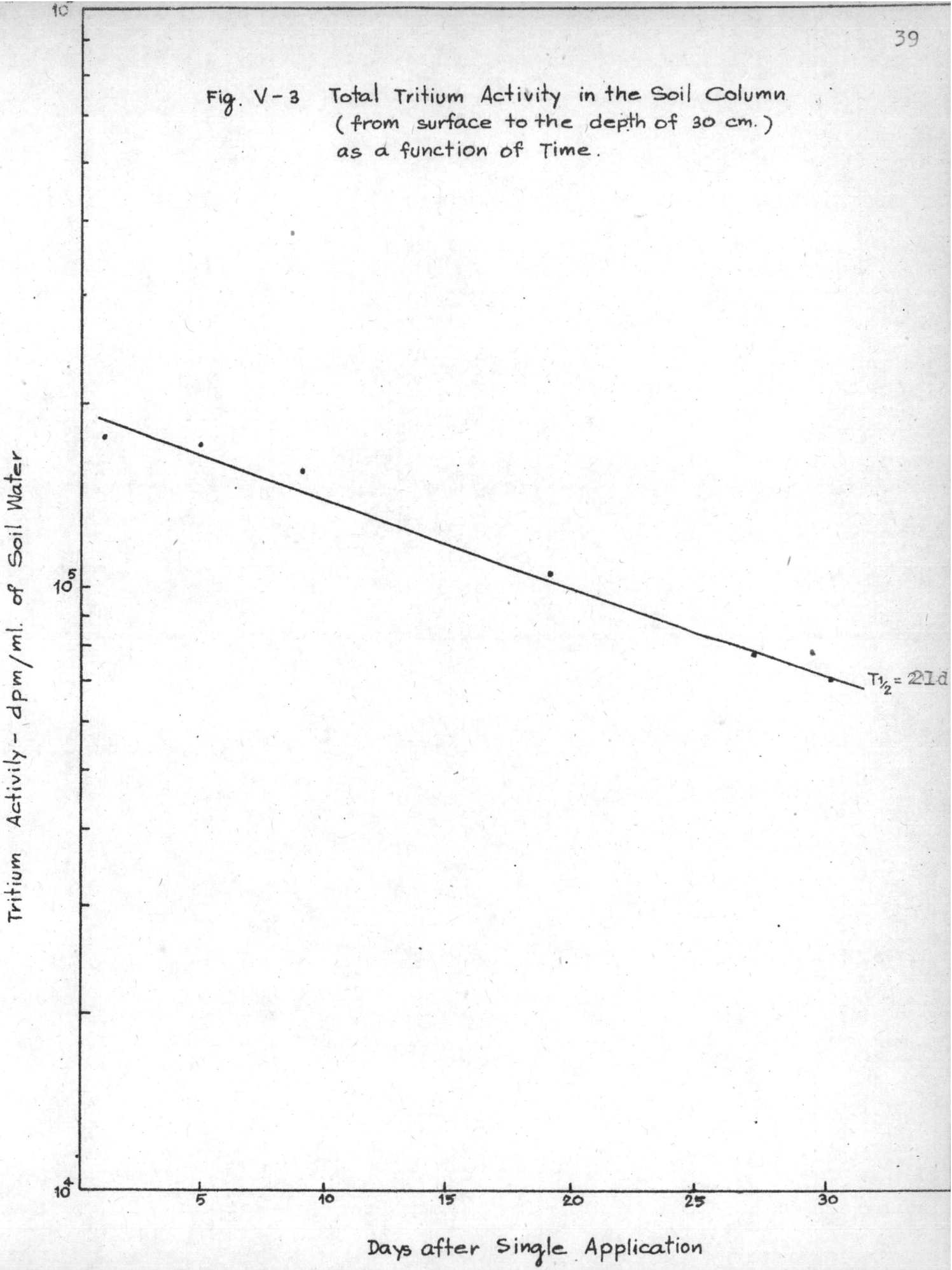
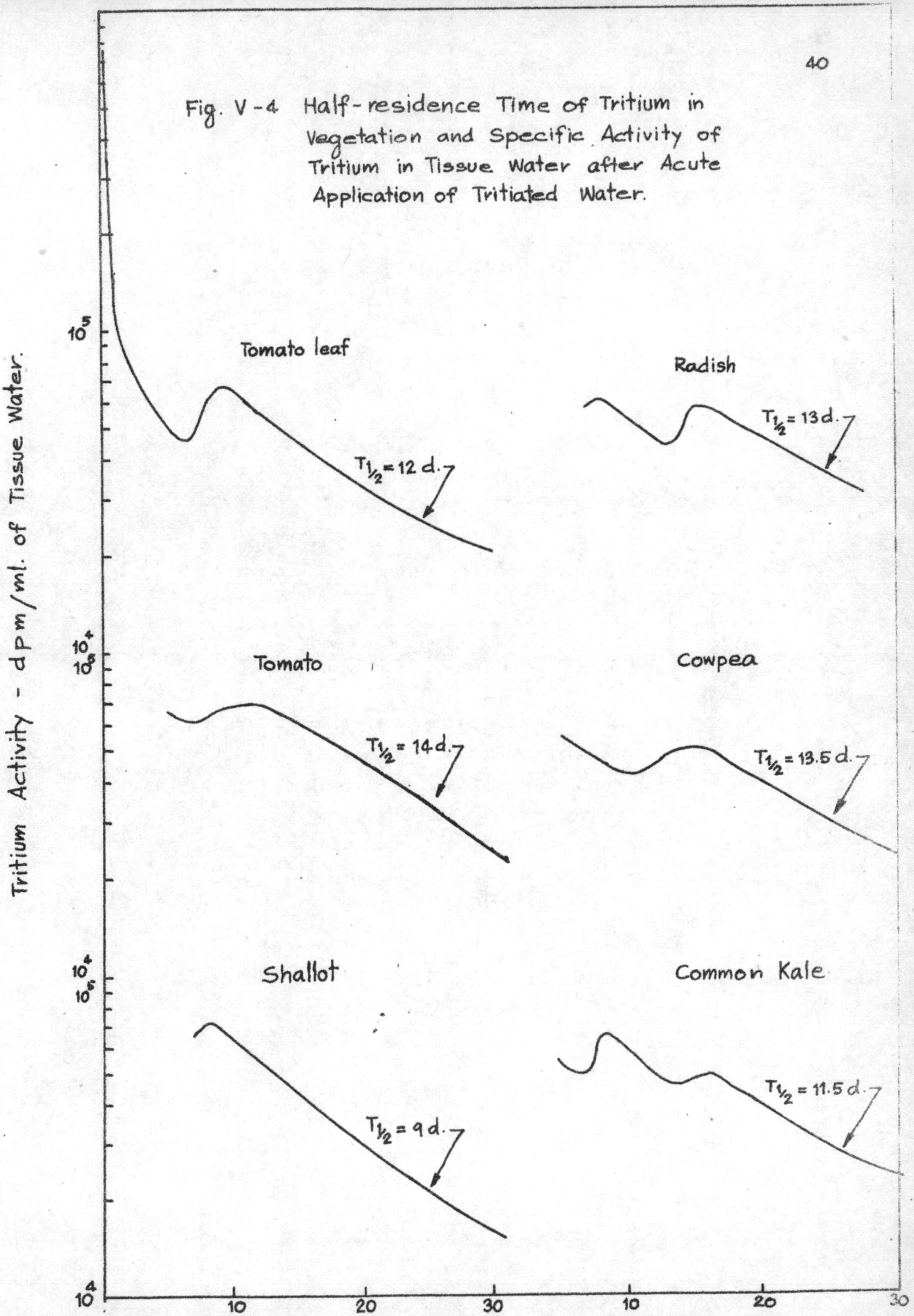


Fig. V-4 Half-residence Time of Tritium in Vegetation and Specific Activity of Tritium in Tissue Water after Acute Application of Tritiated Water.



the decrease proceeds slowly with the half-residence time between 9 to 14 days. In the case of Tomato leaf, the tritium concentration decreased very rapidly in the first part of 5 days of surface application. This is due to the transpiration of the Tomato leaf. The half-residence time of tissue water in the given vegetation obtained are as follows:

Radish	half-residence time	13 days
Common Kale	"	11.5 days
Tomato	"	14 days
Tomato (leaf)	"	12 days
Shallot	"	9 days
Cowpea	"	13.5 days

The half-residence time of tissue water in vegetation obtained is shorter compared to half-residence time of the soil water. The results obtained from the research follow well with those of Koranda and Martin in their experiment performed at Sedan crater in the Nevada desert[1/].

The specific activity of tritium found in the air over the experimental plot is 72,359 pCi/ml (or about 0.7% of the initial concentration) after one hour of application. This is due to the vaporization of soil water and transpiration of vegetation.

1/ Koranda, J.J., Martin, J.R. 1971. The Movement of Tritium in Ecological System. UCRL-73178, LLL, Livermore, Cal.