

● MOBILITY OF CHEMICALS IN SOIL

$$R = V_w/V_p$$

$$R = 1 + \rho_b K_d/\Theta$$

R = Water velocity relative to pollutant velocity (Retardation)

V_w = Velocity of water

V_p = Velocity of pollutant

ρ_b = soil bulk density

K_d = soil partition coefficient

= conc. in soil/conc. in water

$$= \frac{C_c (\text{ug/gm})}{C_w (\text{ug/ml})} = \frac{\text{ml}}{\text{gm}}$$

Θ = soil moisture content

$$R = 1 + \frac{[\text{gm/cc}] [\text{ml/gm}]}{[\text{cc/cc}]}$$

$$= 1 + \frac{[\text{ml/cc}]}{[\text{cc/cc}]} \text{ and since ml=cc}$$

$$= 1 + \frac{[\text{cc/cc}]}{[\text{cc/cc}]}$$

$$R = \text{UNITLESS}$$

RETARDATION EXAMPLE

Assume:

$$\rho_b = 1.4 \text{ gm/cc}$$

$$\Theta_v = 0.2 \text{ cc/cc}$$

$$K_d = 2 \text{ ml/gm}$$

Then: using

$$R = 1 + \rho_b K_d / \Theta$$

results in:

$$R = 1 + [1.4] [2] / [0.2]$$

$$R = 1 + [2.8] / [0.2]$$

$$R = 1 + 14$$

$$R = 15$$

Interpretation: The pollutant will move 15 times more slowly than the water through the soil.