

AGRY 515 2008

- Nutrient Bioavailability
- Nutrient Movement in Soils
- Nutrient Concentrations in the Rhizosphere

Figure 1

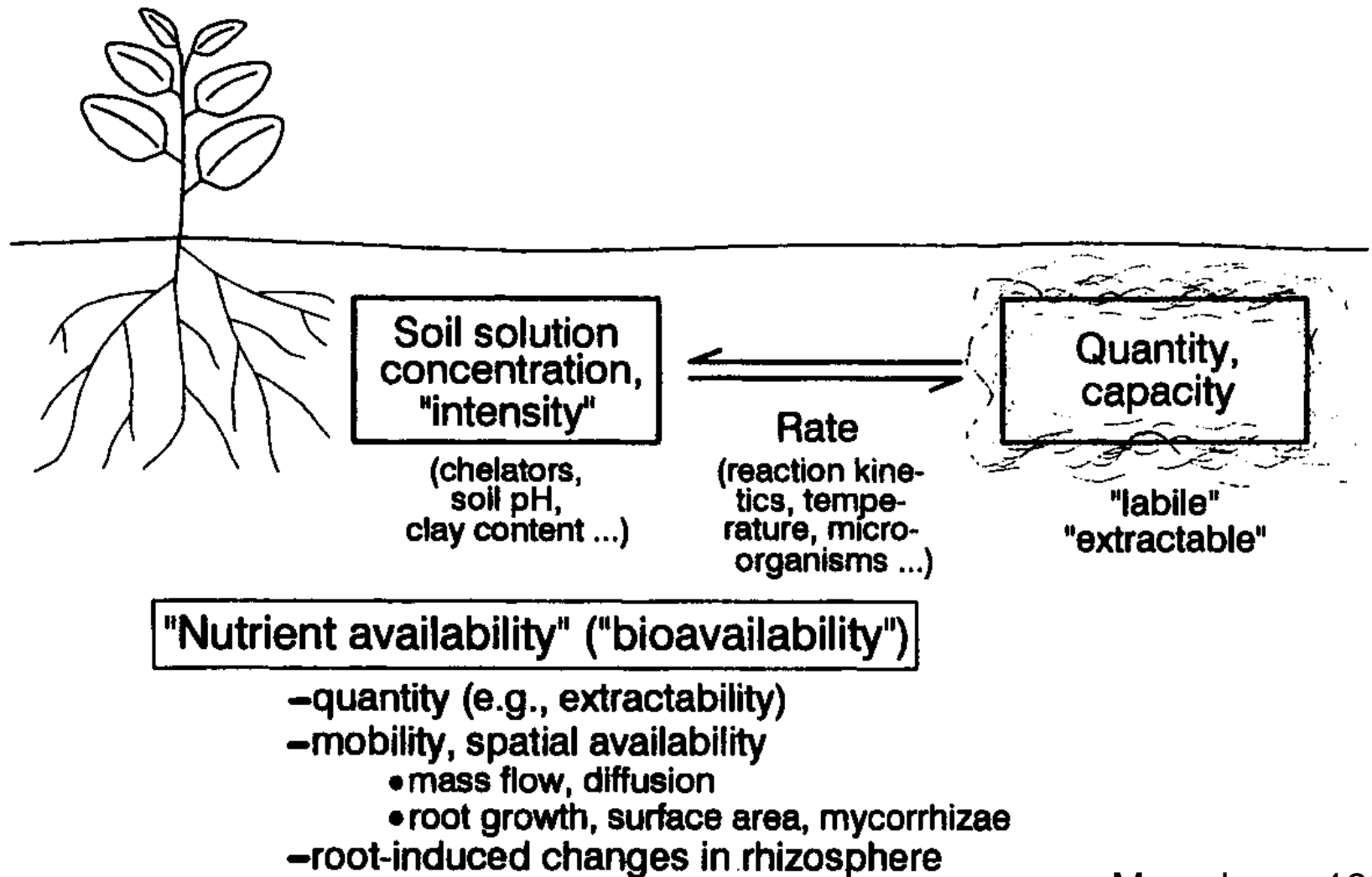
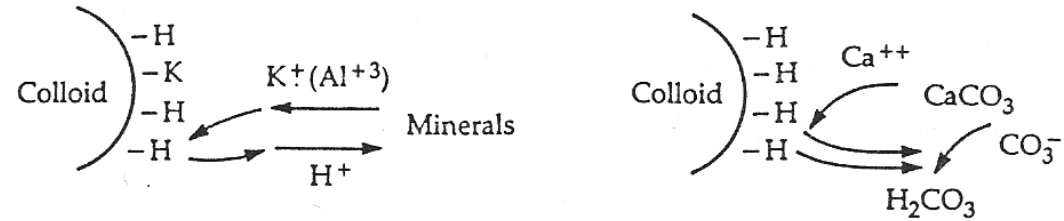
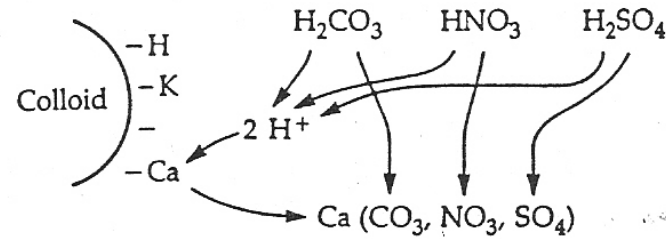


Figure 2

(a) Weathering



(b) Precipitation



(c) Biological

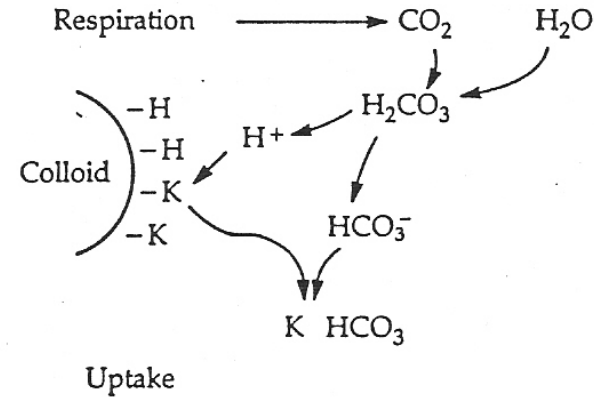


Figure 9.8
Processes affecting the relative concentration of different cations on exchange sites in temperate soils.

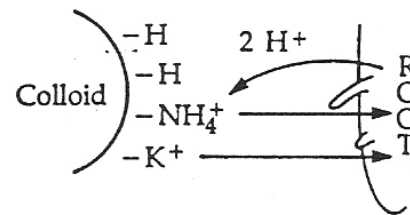


Figure 3

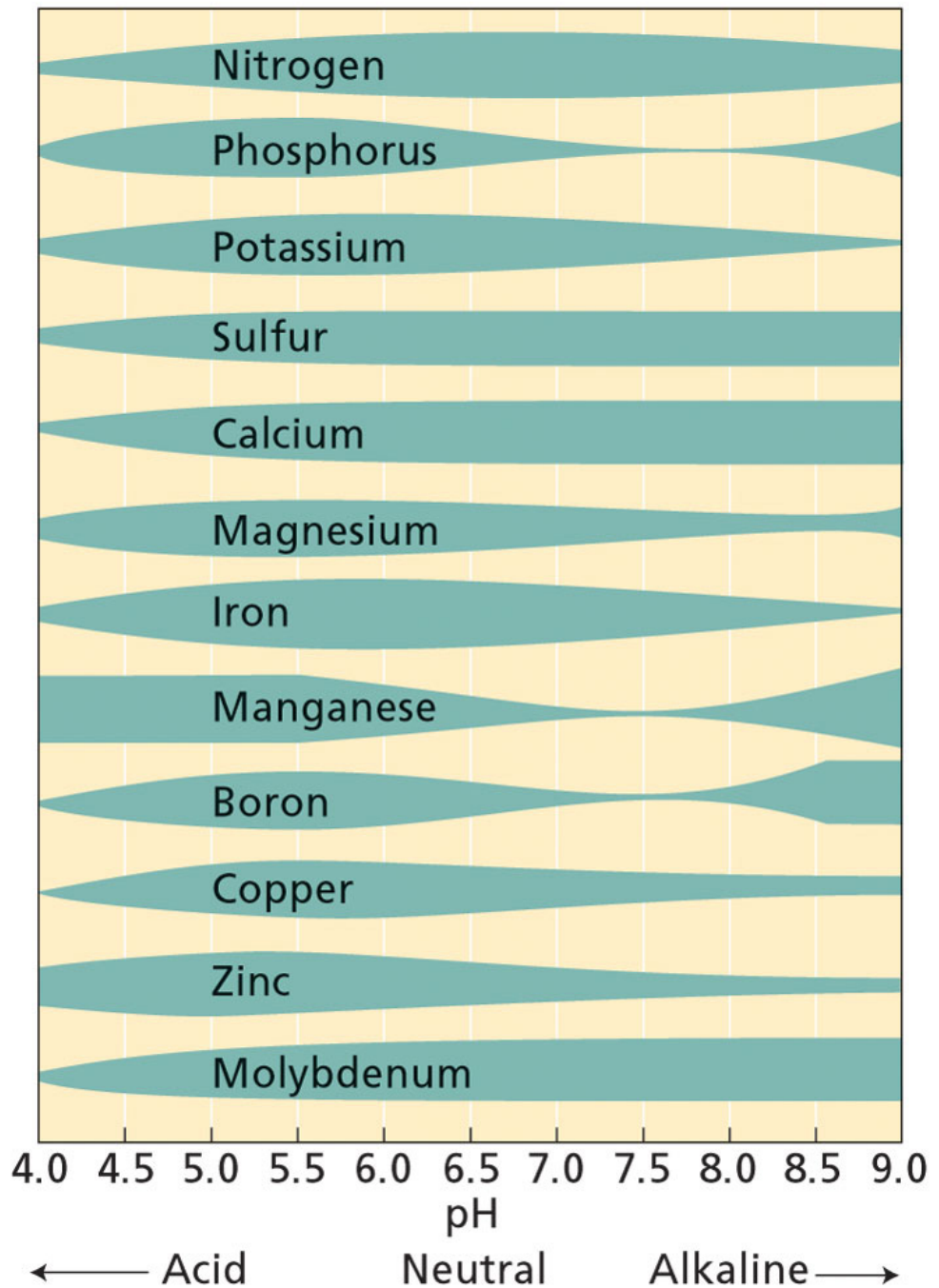


Figure 4

What is soil buffer power?

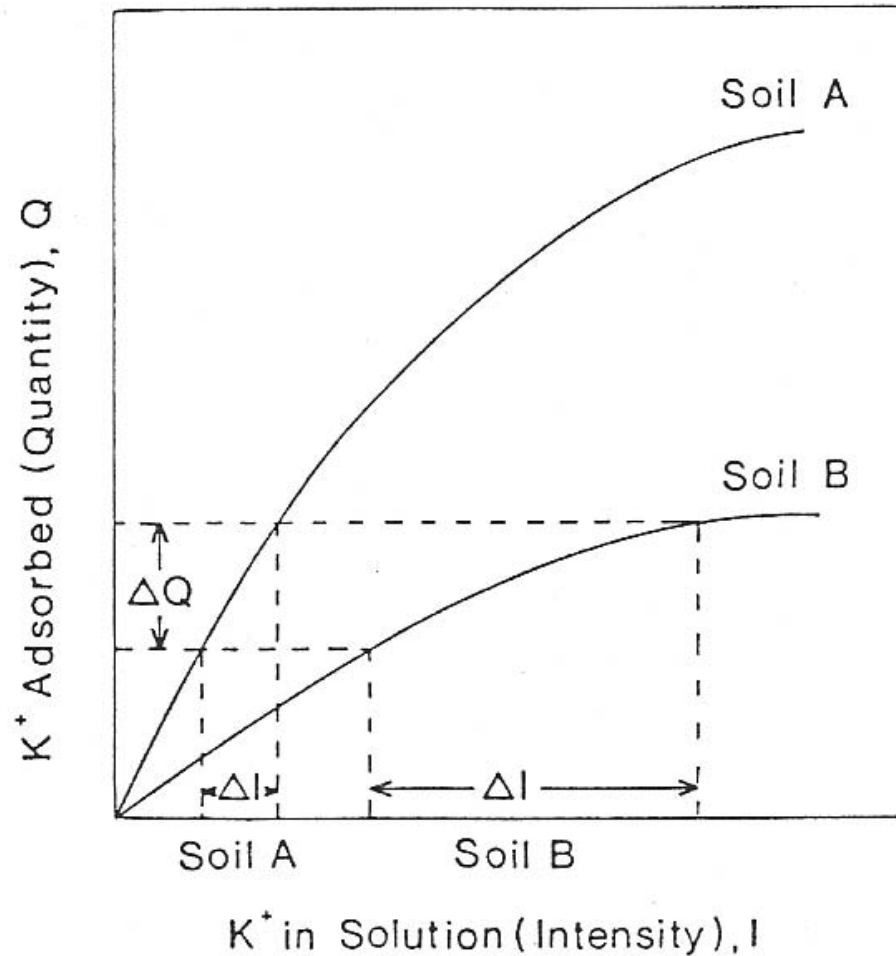


Fig. 2.18 Relationship between K^+ intensity and K^+ quantity for two soils with different adsorbing capacities (Soil A high and Soil B low).

MENGEL & KIRKBY 1987

Figure 5

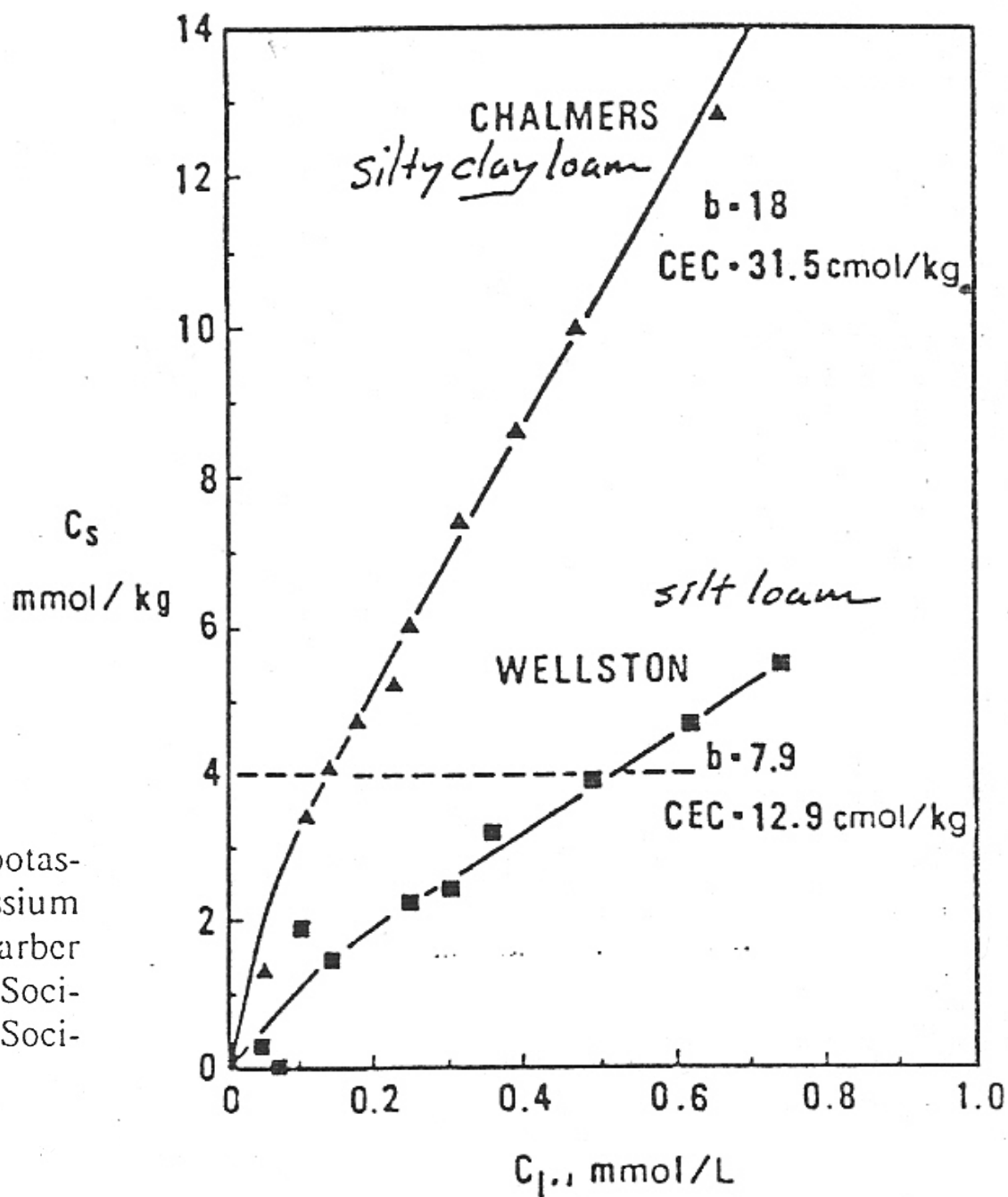


FIGURE 2.7 Plot of solution potassium versus exchangeable potassium for two soils. Reproduced from Barber (1981) by permission of American Society of Agronomy and Soil Science Society of America.

BARBER, 1995

Table 1

Table 13.6

Plant Uptake and Estimates on Supply to the Roots by Mass Flow of Potassium, Magnesium, and Calcium in Spring Wheat and Sugar Beet Grown in a Silty Loam Soil (Luvisol Derived from Loess)^a

	Amount (kg ha ⁻¹)					
	Spring wheat			Sugar beet		
	K	Mg	Ca	K	Mg	Ca
Plant uptake	215	13	35	326	44	104
Mass flow	5	17	272	3	10	236
(% of total uptake)	(2)	(131)	(777)	(1)	(23)	(227)

^aFrom Strebel and Duynisveld (1989).

MARSCHEK, 1995

Table 2

Table 13.7
Estimates of Diffusion Coefficients ($\text{m}^2 \text{s}^{-1}$) of Ions in Water (D_1) and in Soils (D_e), and of Movement per Day at Average Values of D_e^a

Ion	Diffusion coefficient		Average D_e in soils	Movement in soils (mm per day)
	Water (D_1)	soil (D_e)		
NO_3^-	1.9×10^{-9}	10^{-10} – 10^{-11}	5×10^{-11}	3.0
K^+	2.0×10^{-9}	10^{-11} – 10^{-12}	5×10^{-12}	0.9
H_2PO_4^-	0.9×10^{-9}	10^{-12} – 10^{-15}	1×10^{-13}	0.13

^aFrom Jungk (1991). Reprinted by courtesy of Marcel Dekker Inc.

MARSHNER, 1995

Figure 6

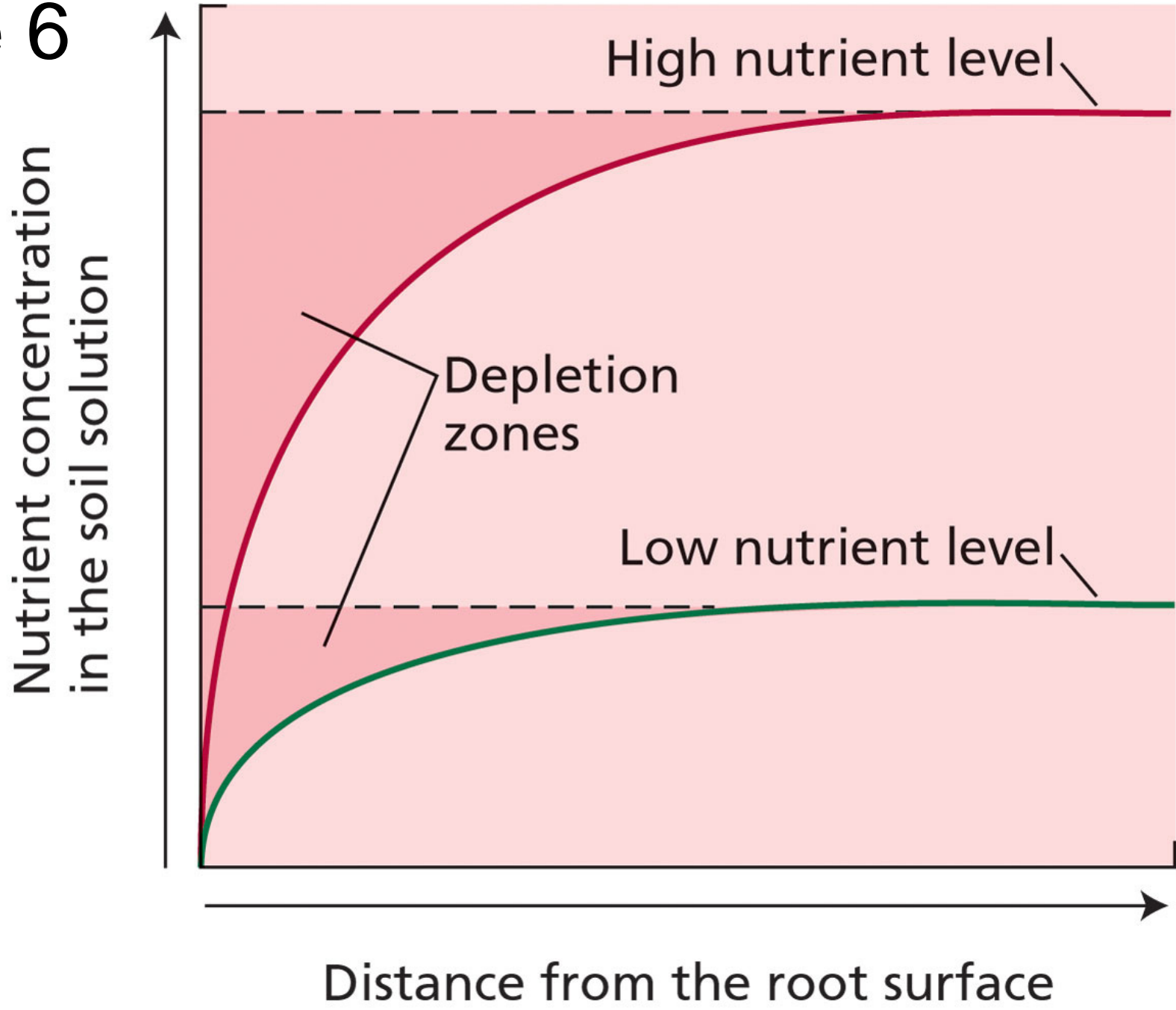


Figure 7

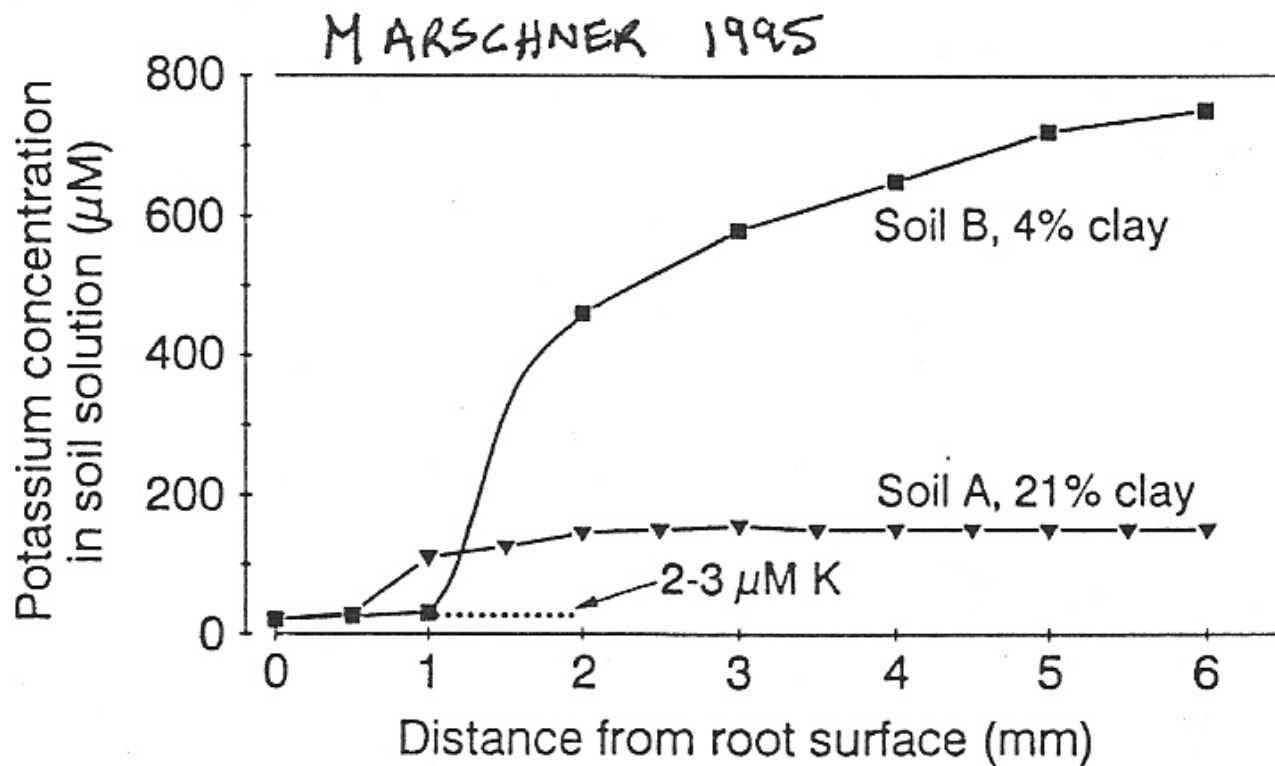


Fig. 13.3 Concentration gradient of potassium in the soil solution around maize roots growing in soils with different clay contents. Potassium concentration at the root surface, 2-3 μM . (Modified from Claassen and Jungk, 1982.)