Daily Drip Irrigation for the Highest Yields

A Discussion About Daily versus Intermittent Irrigation

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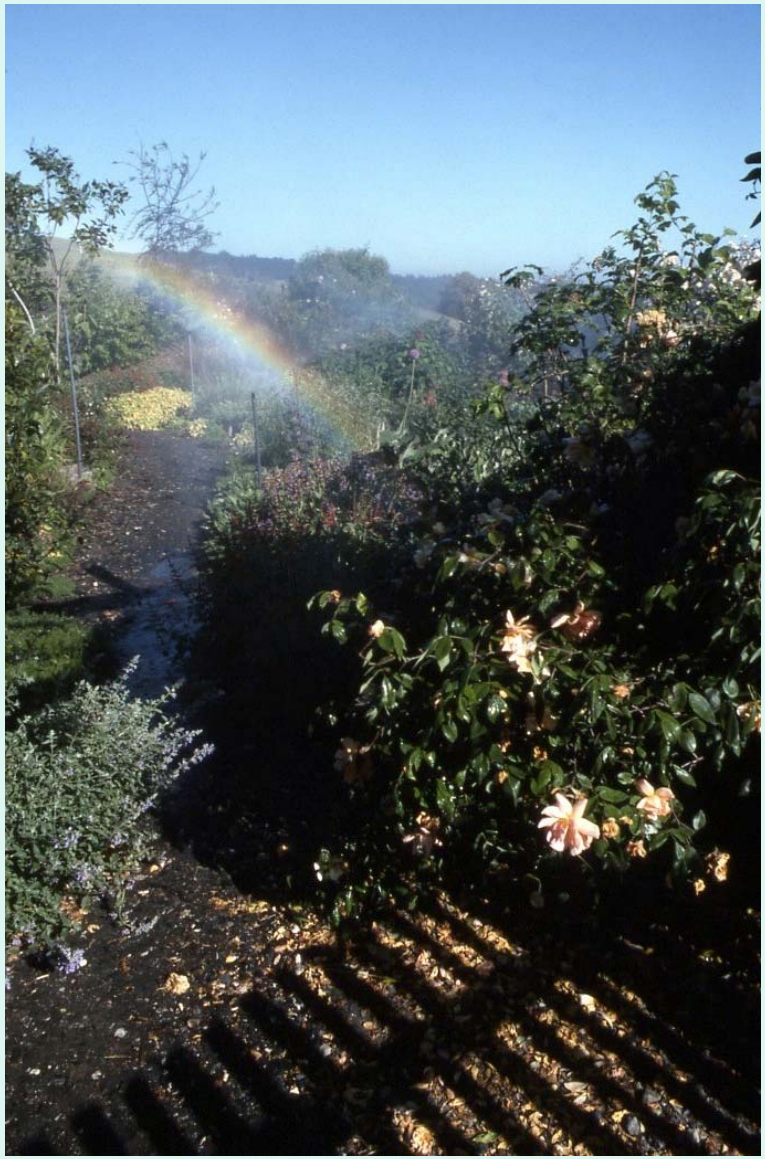
1 ► Superior Growth
2 ► Efficient Distribution
3 ► Maximum Control
4 ► Water Conservation

Micro-Sprinklers Above the Foliage

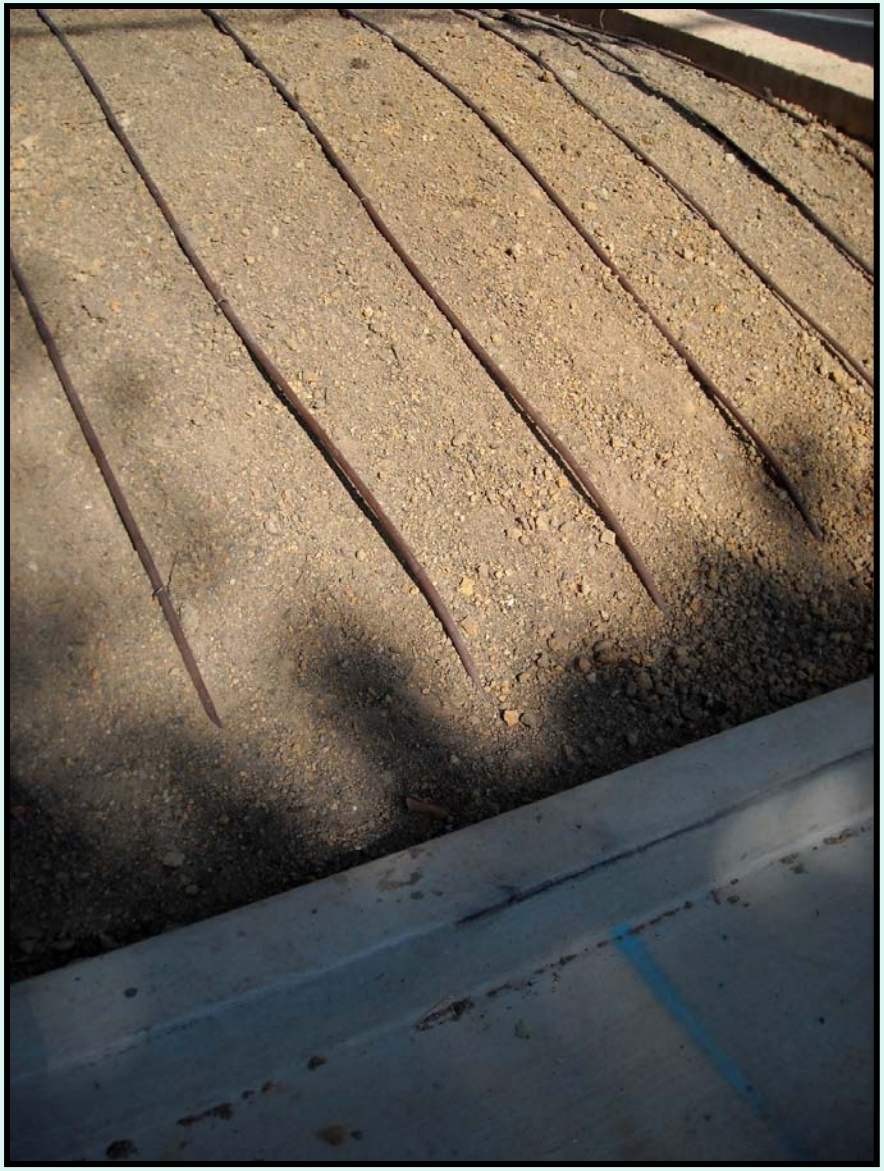


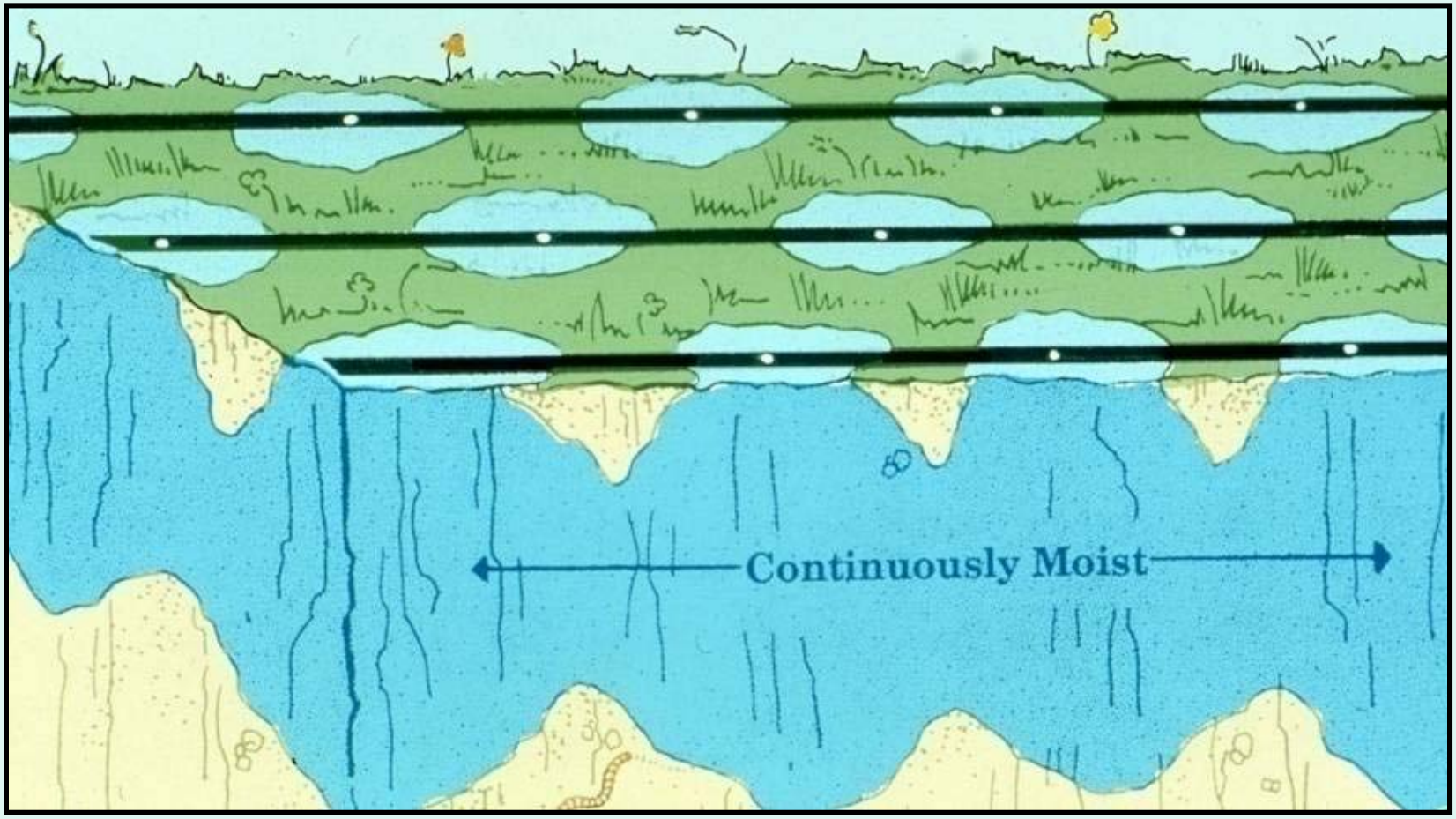
Daily Water Use (In Gallons per Day)

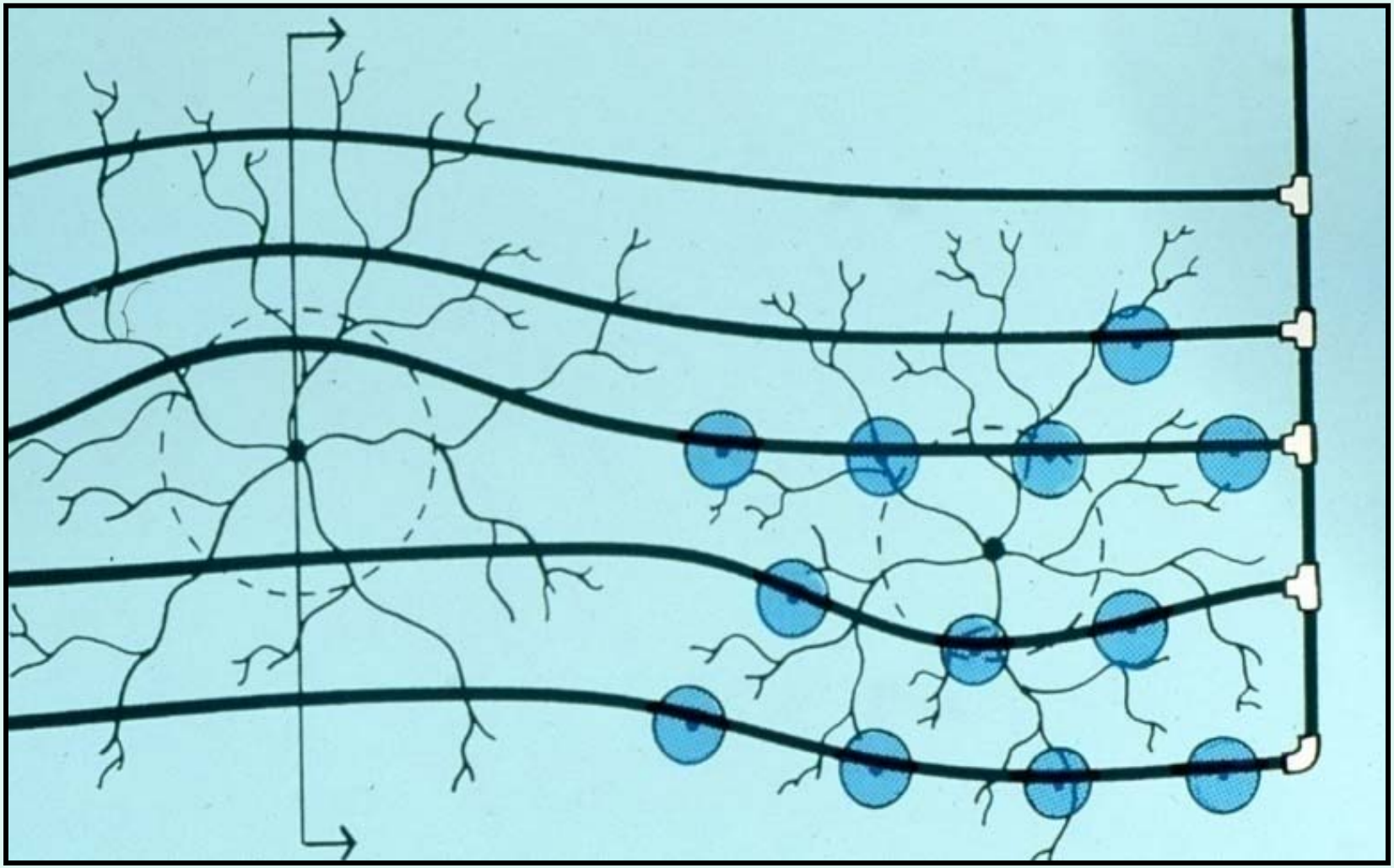
BASED ON VARIOUS EVAPOTRANSPIRATION RATES

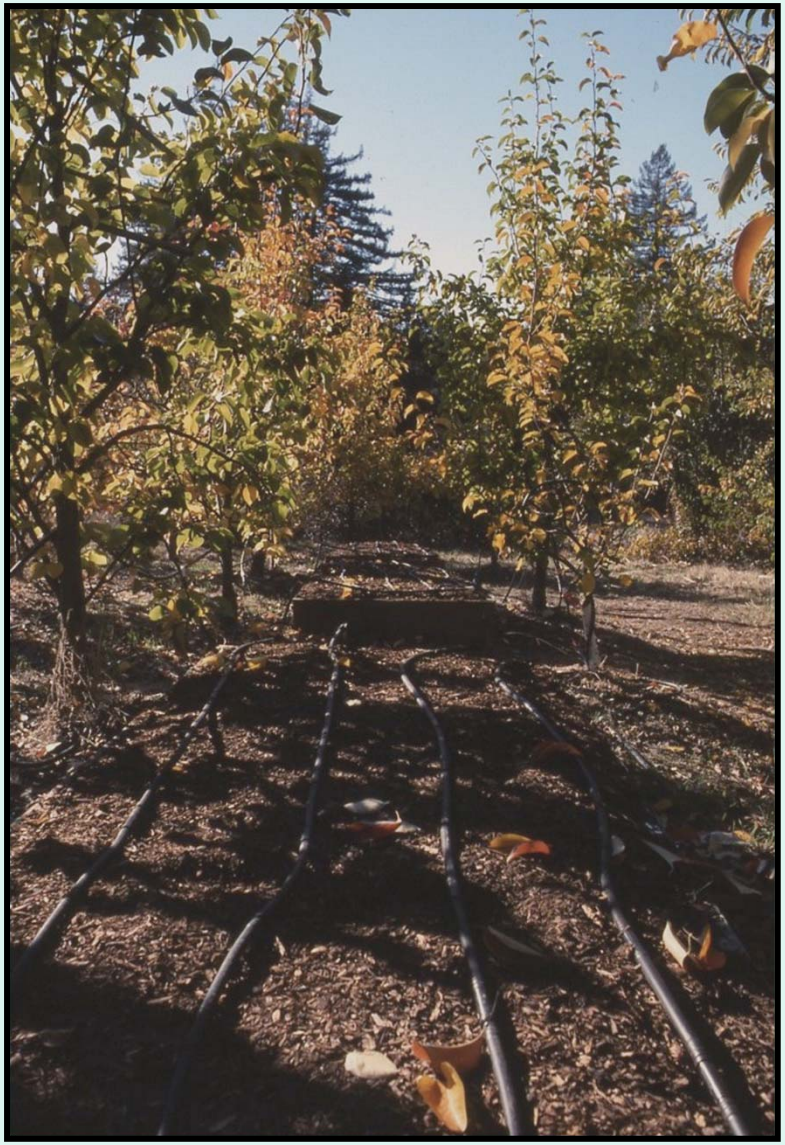
Square Feet of Plant Cover	ET Rate (in inches/month)									
	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"
1 sq. ft.	0.0187	0.0374	0.062	0.083	0.104	0.125	0.145	0.166	0.187	0.208
4 sq. ft.	0.075	0.15	0.248	0.332	0.416	0.5	0.58	0.664	0.75	0.832
10 sq. ft.	0.187	0.374	0.62	0.83	1.04	1.25	1.45	1.66	1.87	2.08
75 sq. ft.	1.403	2.805	4.65	6.225	7.8	9.4	10.875	12.45	14.0	15.6
100 sq. ft.	1.87	3.74	6.2	8.3	10.4	12.5	14.5	16.6	18.7	20.8
200 sq. ft.	3.74	7.480	12.4	16.6	20.8	25.0	29.0	33.2	37.4	41.6
300 sq.ft.	5.61	11.22	18.6	24.9	32.2	37.5	43.5	49.8	56.1	62.4
1 acre solid cover	815	1629	2701	3615	4530	5445	6316	7231	8146	9060

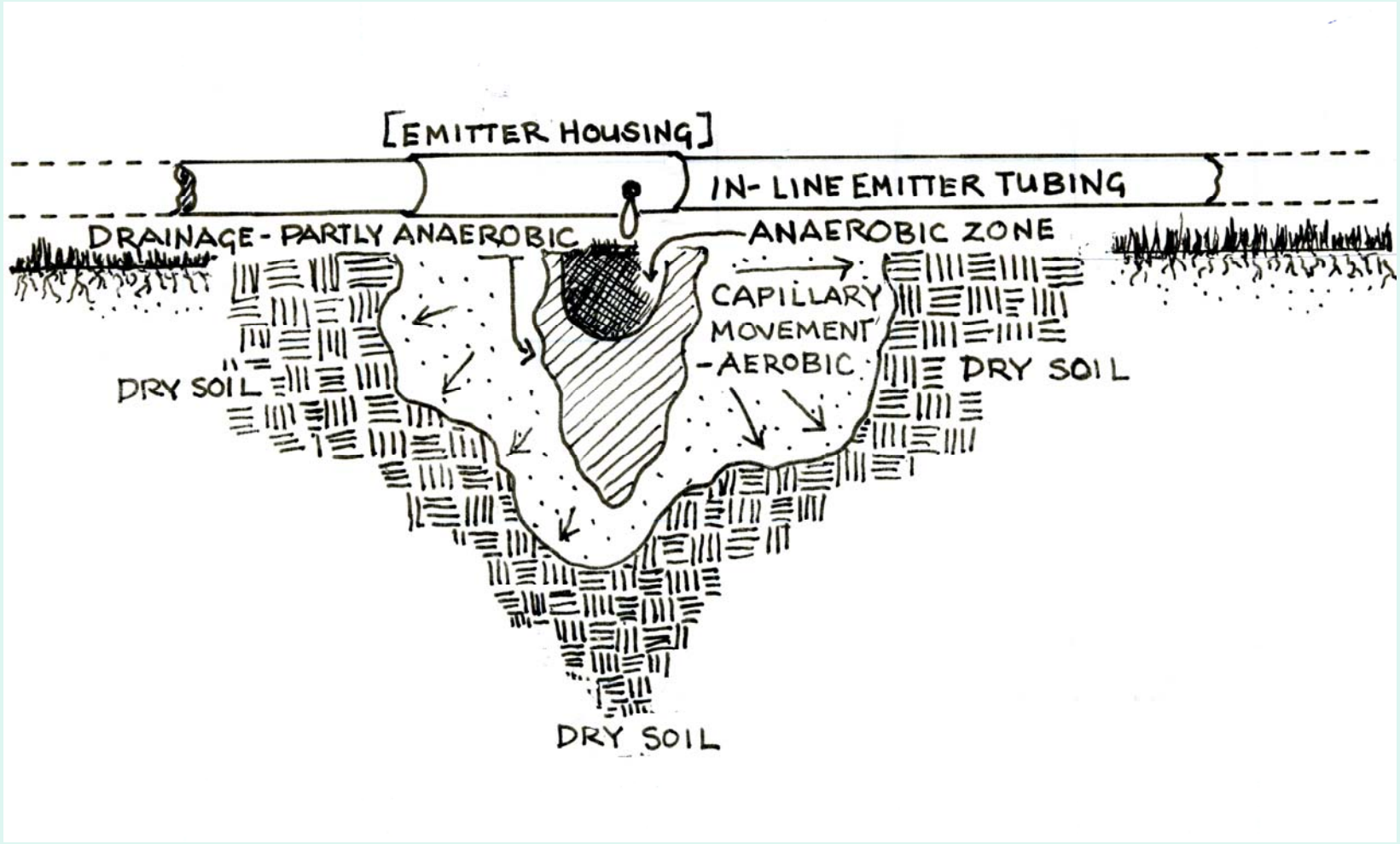

Sale & Lease
824-1514




Continuously Moist






[EMITTER HOUSING]
IN-LINE EMITTER TUBING
DRAINAGE - PARTLY ANAEROBIC
ANAEROBIC ZONE
CAPILLARY MOVEMENT -AEROBIC
DRY SOIL
DRY SOIL
DRY SOIL

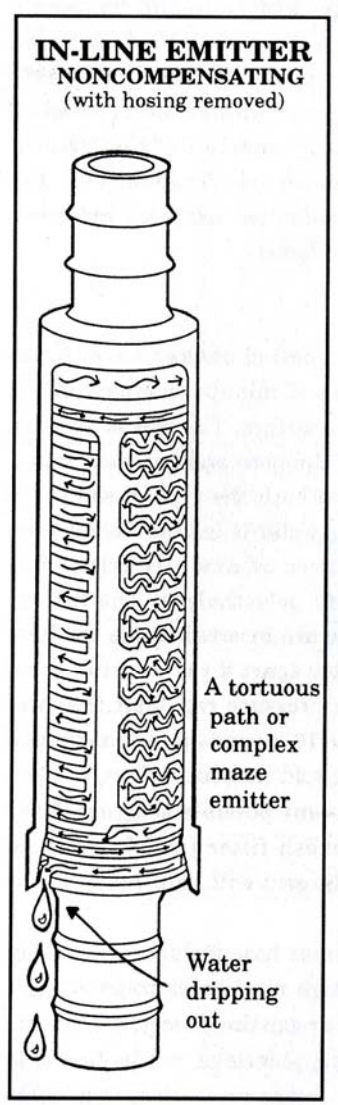
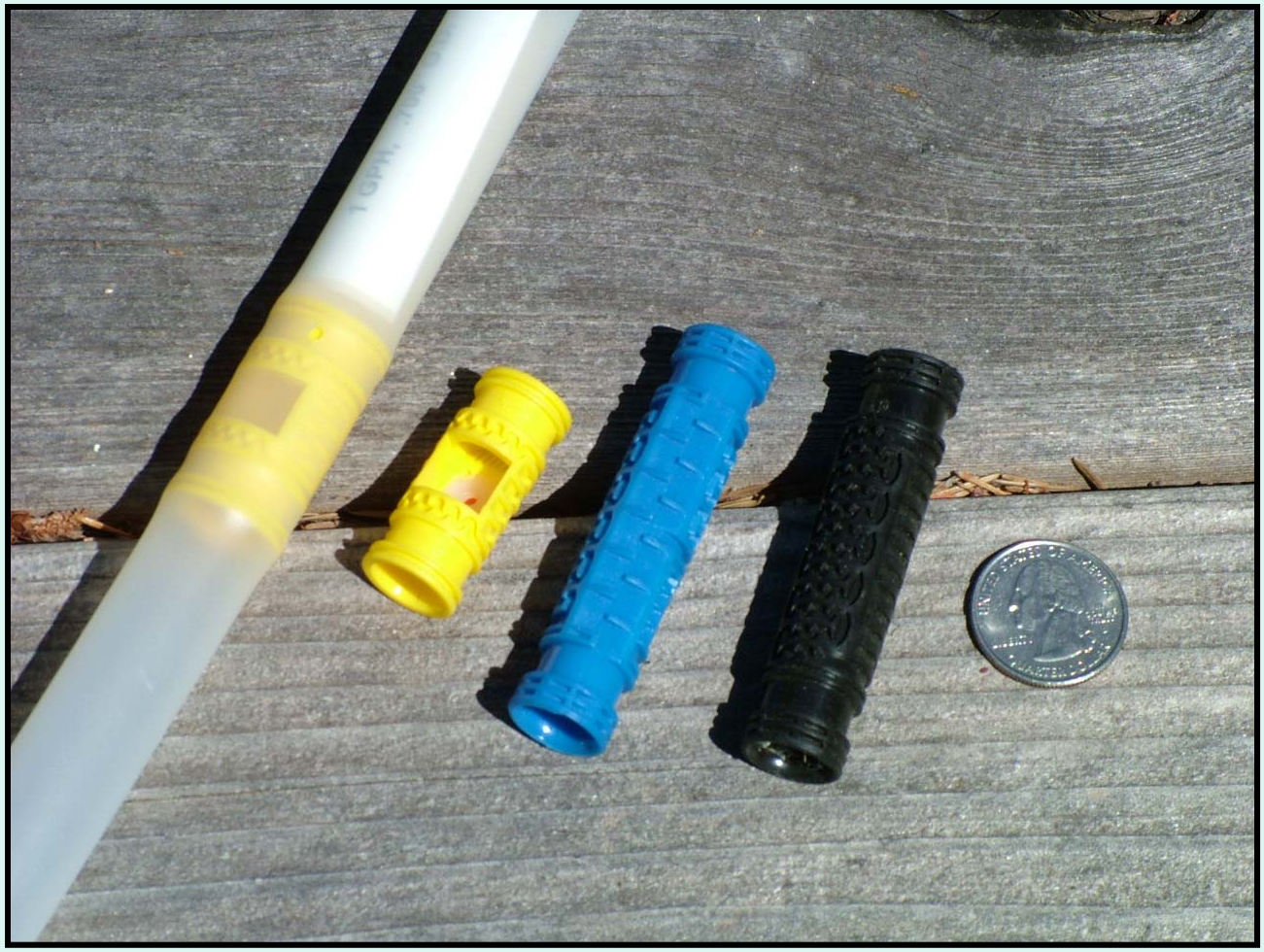


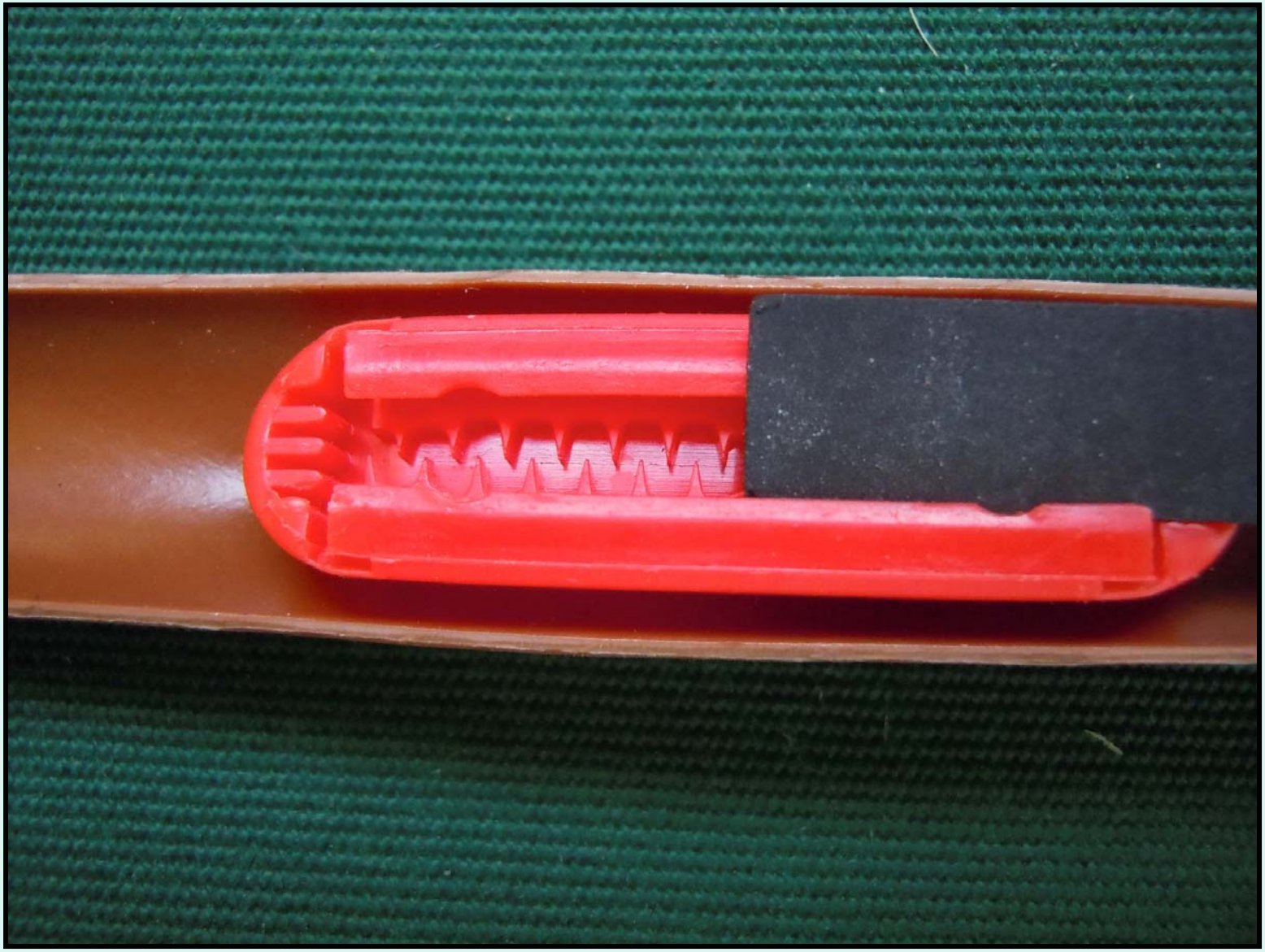
Figure 11 The in-line emitter is built inside the drip irrigation hose. This type has a complex path for the water to follow, known as a "tortuous path," which regulates the flow and helps keep the emitter unclogged. This is *not* pressure compensating.

Inside an In-Line Emitter.

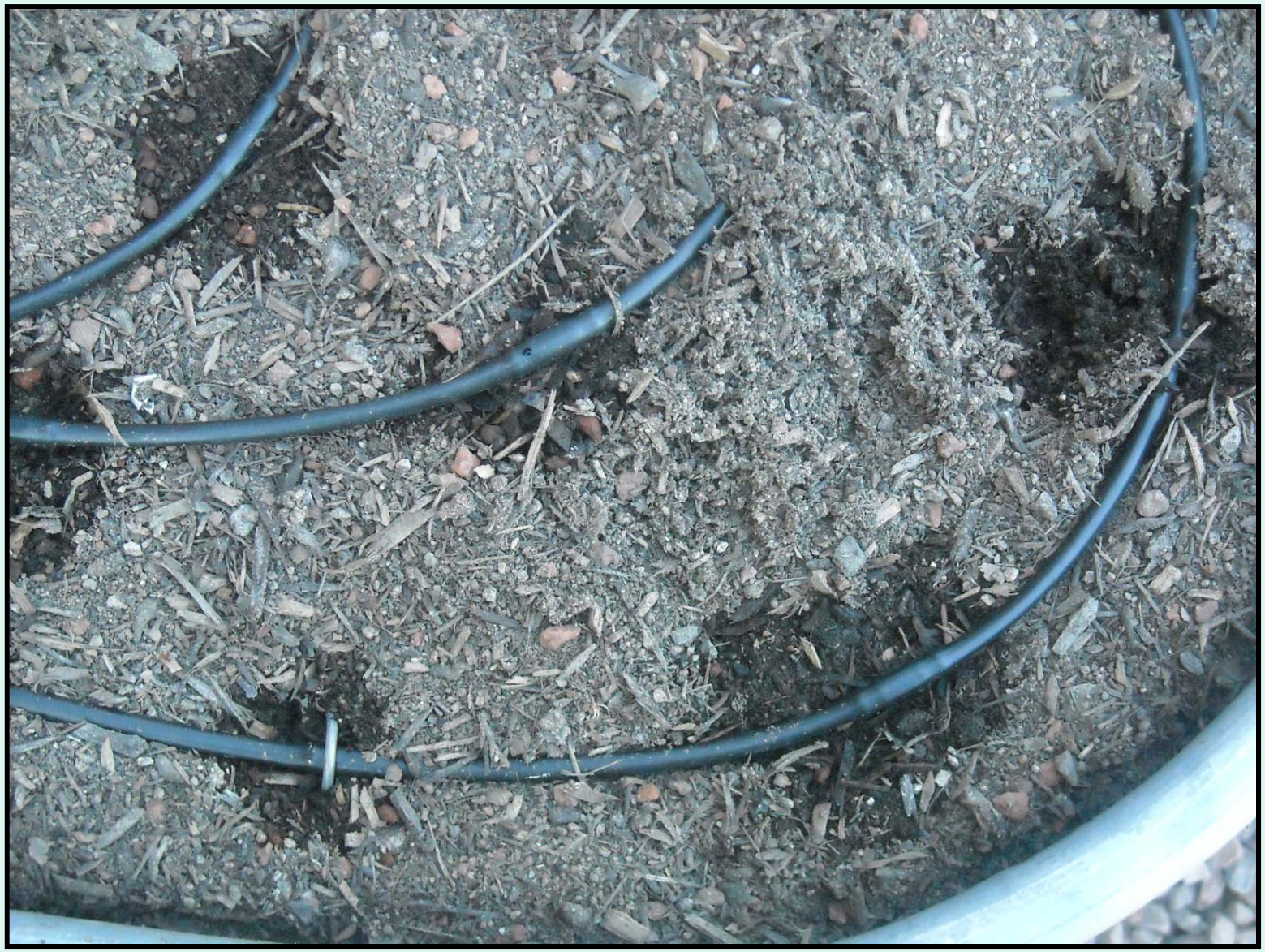
The water moves like a small horizontal tornado. This keeps all particulates in suspension until the "dirty" water reaches the larger-than-normal orifice.

Various In-Line Emitters; 2gph, 1gph, 1/2gph





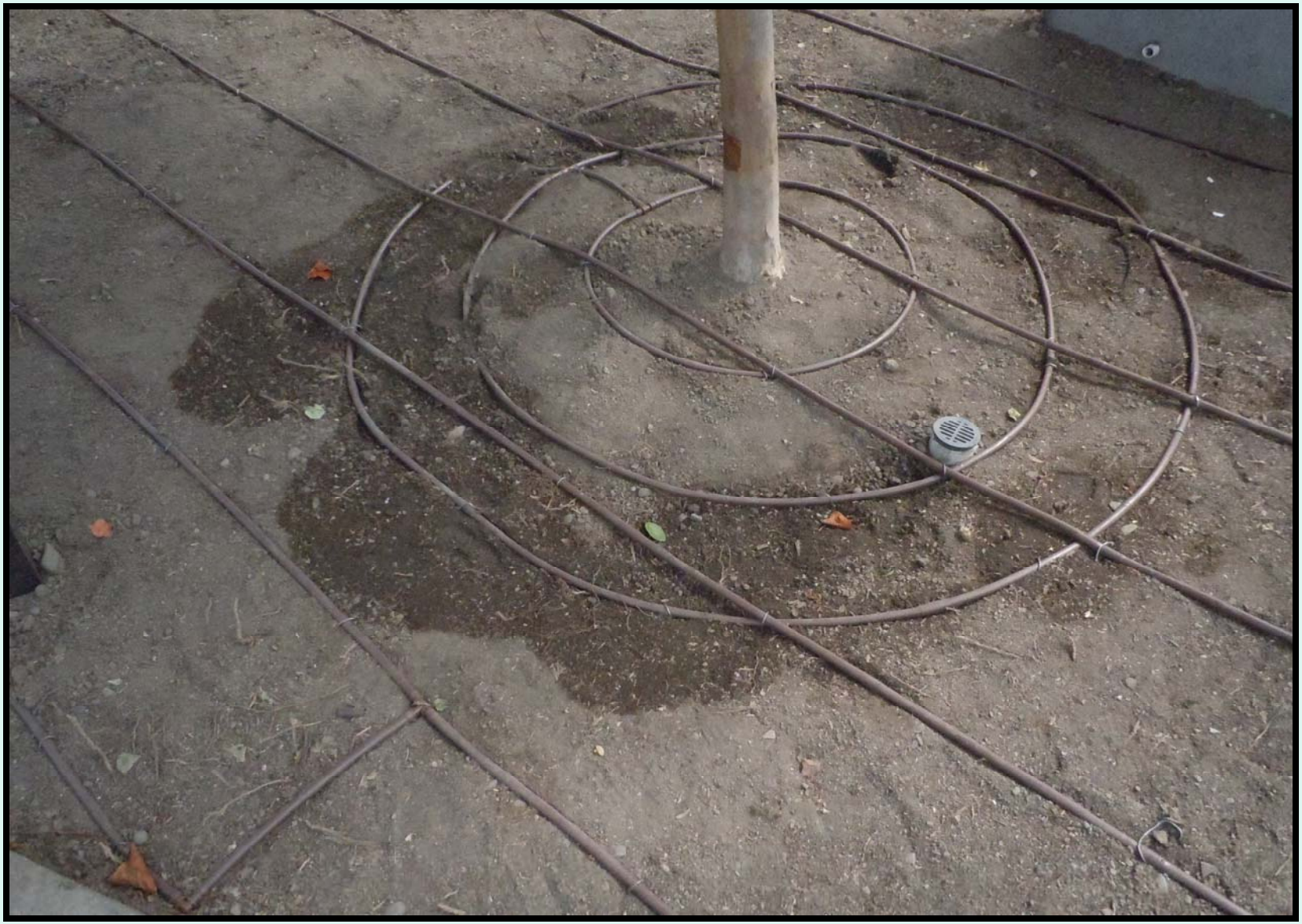
1/4-inch In-line Drip Tubing

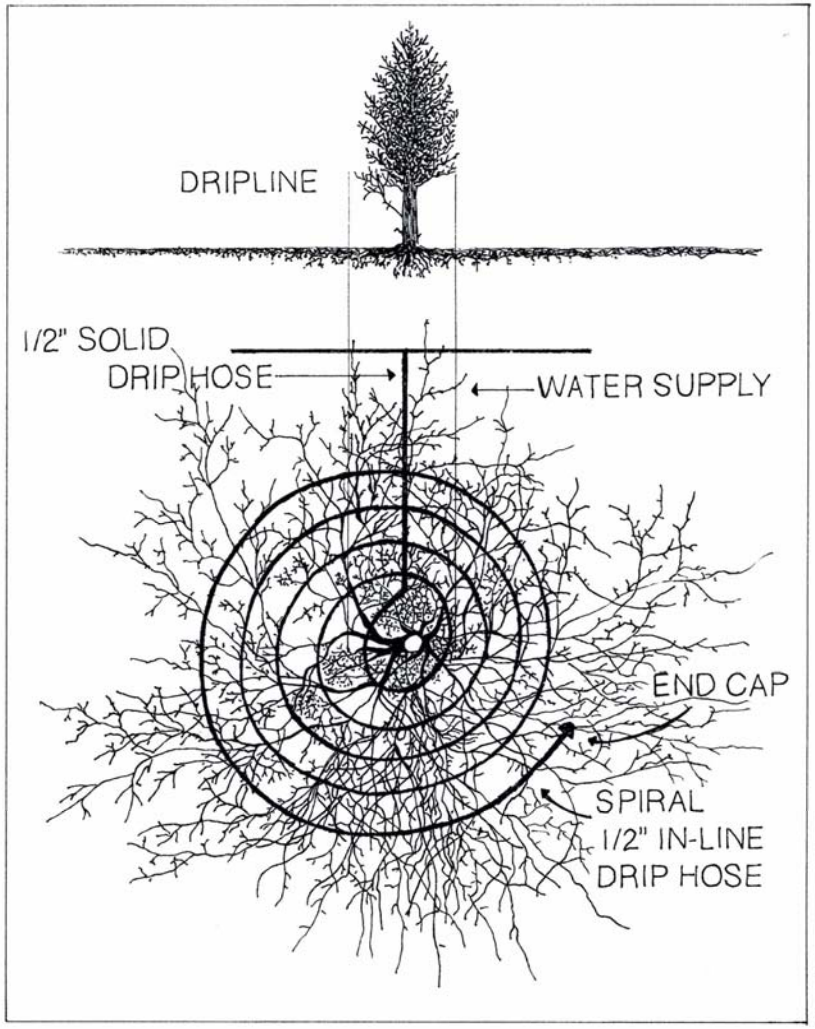


Plant *Between* the Wet Spots

Cover with Mulch for Beauty & A Longer Life.

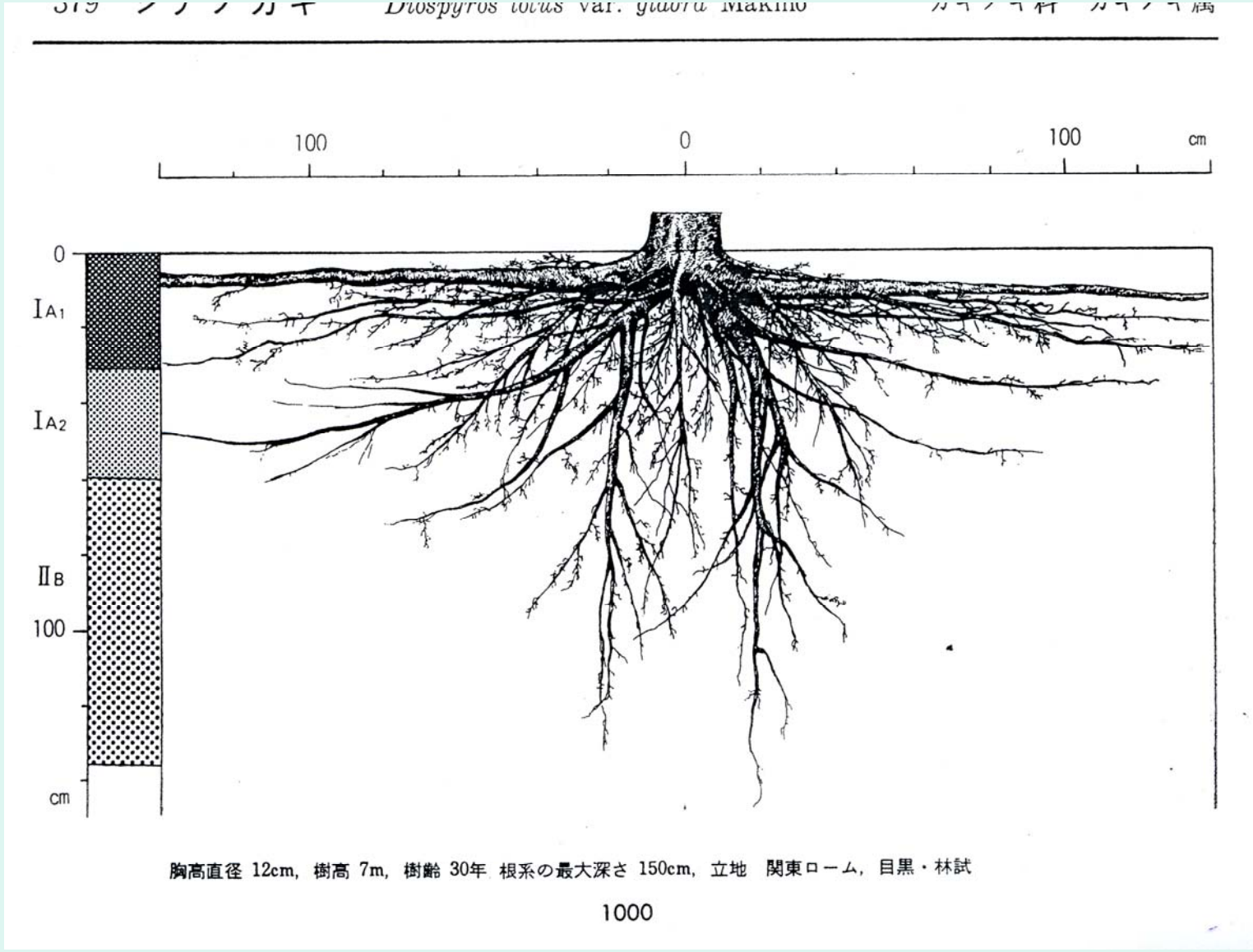
Arbor Mulch




DRIPLINE
1/2" SOLID
DRIP HOSE
WATER SUPPLY
END CAP
SPIRAL
1/2" IN-LINE
DRIP HOSE

Chinese Medicinal Herb Farm

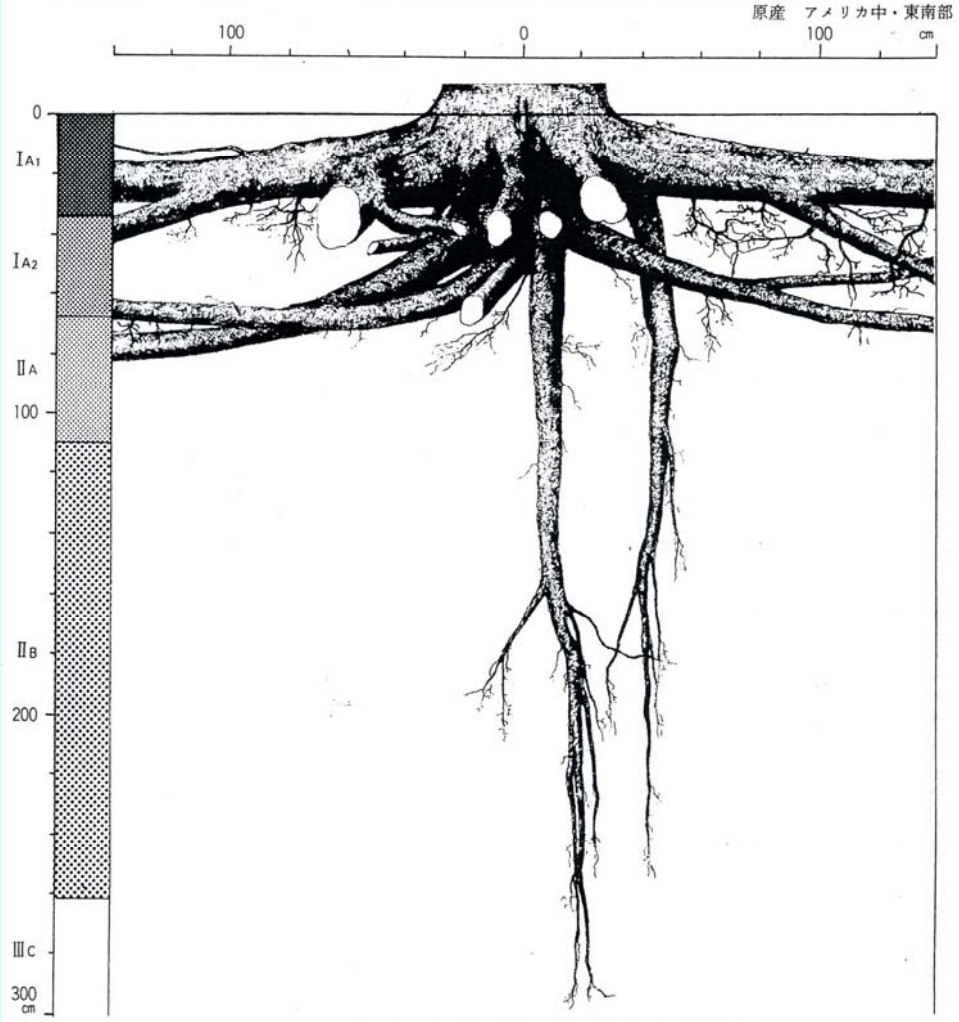
Most plants don’t send many roots into clay subsoil. Main roots are only as deep as the topsoil. Even in deep topsoil, most of a tree’s roots are found in the top 12-18 inches.



Persimmon Roots (100 cm = 39 inches)

86 **クログルミ** （アメリカグルミ） *Juglans nigra* Linn.　　クルミ科　クルミ属

原産　アメリカ中・東南部



胸高直径 45cm，樹高 18m，樹齢 70年　根系の最大深さ 300cm，立地　関東ローム，目黒・林試

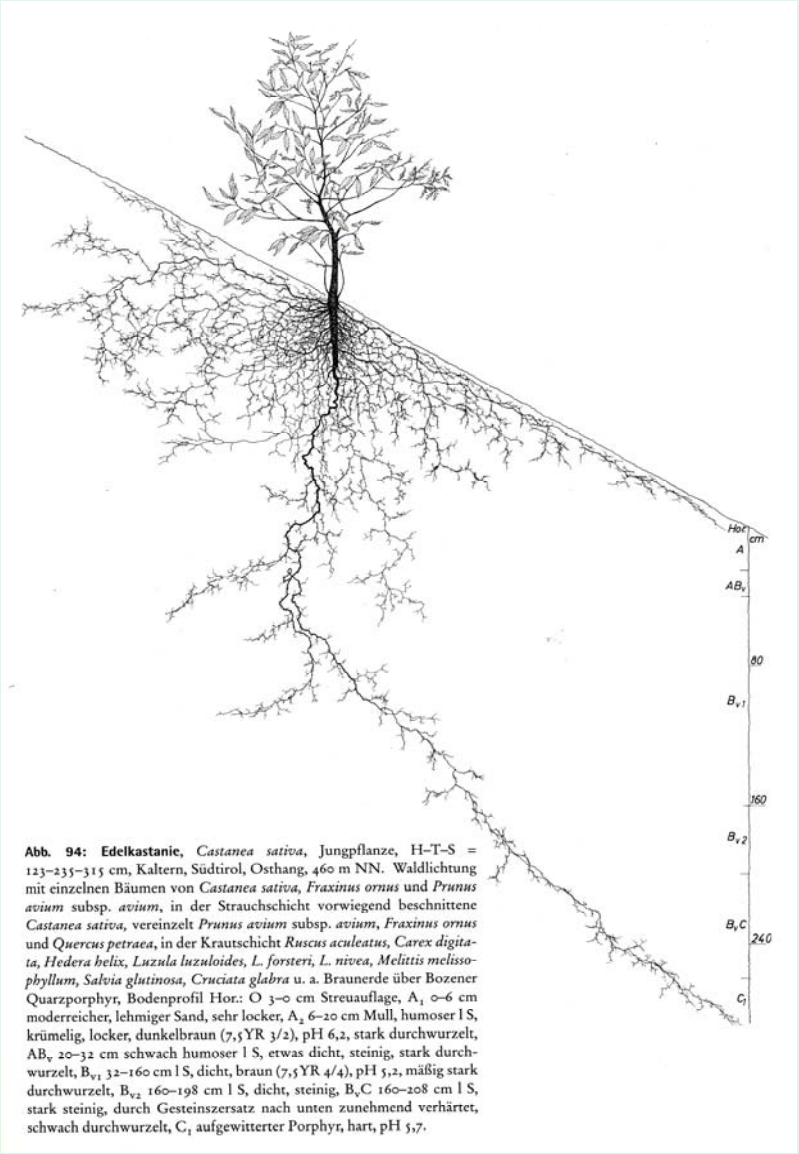
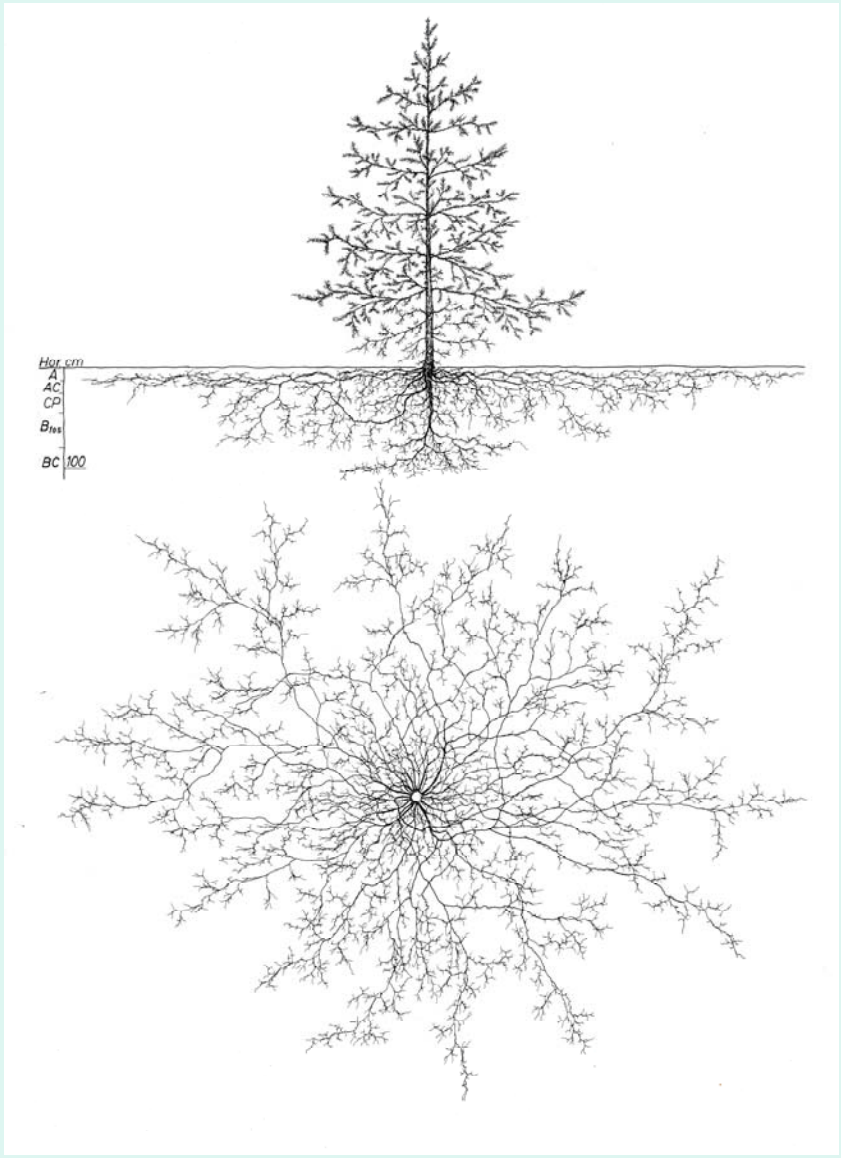


Abb. 94: Edelkastanie, *Castanea sativa*, Jungpflanze, H–T–S = 123–235–315 cm, Kaltern, Südtirol, Osthang, 460 m NN. Waldlichtung mit einzelnen Bäumen von *Castanea sativa, Fraxinus ornus* und *Prunus avium* subsp. *avium*, in der Strauchschicht vorwiegend beschnittene *Castanea sativa,* vereinzelt *Prunus avium* subsp. *avium*, *Fraxinus ornus* und *Quercus petraea*, in der Krautschicht *Ruscus aculeatus, Carex digitata, Hedera helix, Luzula luzuloides, L. forsteri, L. nivea, Melittis melissophyllum, Salvia glutinosa, Cruciata glabra* u. a. Braunerde über Bozener Quarzporphyr, Bodenprofil Hor.: O 3–0 cm Streuauflage, A_1 0–6 cm moderreicher, lehmiger Sand, sehr locker, A_2 6–20 cm Mull, humoser l S, krümelig, locker, dunkelbraun (7,5YR 3/2), pH 6,2, stark durchwurzelt, AB_v 20–32 cm schwach humoser l S, etwas dicht, steinig, stark durchwurzelt, B_{v1} 32–160 cm l S, dicht, braun (7,5YR 4/4), pH 5,2, mäßig stark durchwurzelt, B_{v2} 160–198 cm l S, dicht, steinig, B_vC 160–208 cm l S, stark steinig, durch Gesteinszersatz nach unten zunehmend verhärtet, schwach durchwurzelt, C_1 aufgewitterter Porphyr, hart, pH 5,7.


Hor. cm
A
AC
CP
Btes
BC
100

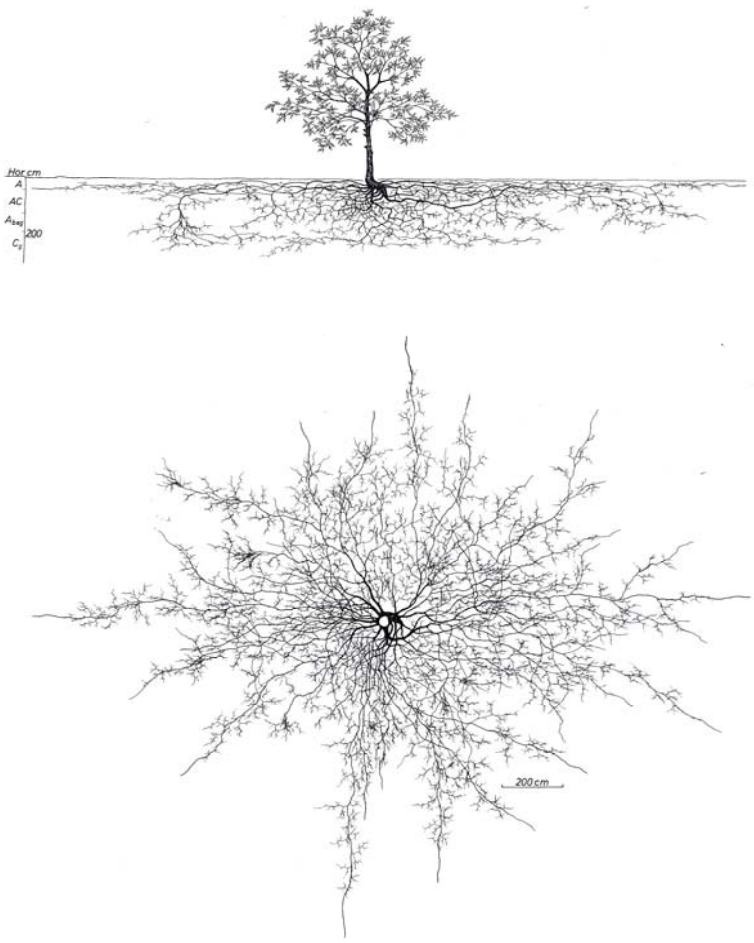


Abb. 141: Gewöhnliche Walnuß, *Juglans regia*, H–T–S = 560–260–2.360 cm, Krastal, nordwestlich Villach, SO-Hang, 540 m NN. Naturverjüngung auf stark verunkrautetem Schuttfächer, schütterer Baumbestand mit Walnuß und vereinzelt Esche, Mullpararendsina, Stockwerkprofil auf Schwemmfächer. Bodenprofil Hor.: 0–40 cm stark humoser, sandiger Lehm, krümelig, bester Mullhumus, locker, stark durchwurzelt, AC 40–120 cm humoser s L, stark durchsetzt mit Kalkschutt, locker, stark durchwurzelt, A_{beg} 120–180 cm stark humoser, lehmiger Sand, schwach durchsetzt mit Kalkschutt, dichter gelagert (überschütteter Oberboden infolge von Vermurung), gut durchwurzelt, C_g schluffiger Feinsand, schwach rostfleckig, schwach durchsetzt mit Kalkschutt, sickerfeucht, Bewurzelung auslaufend.

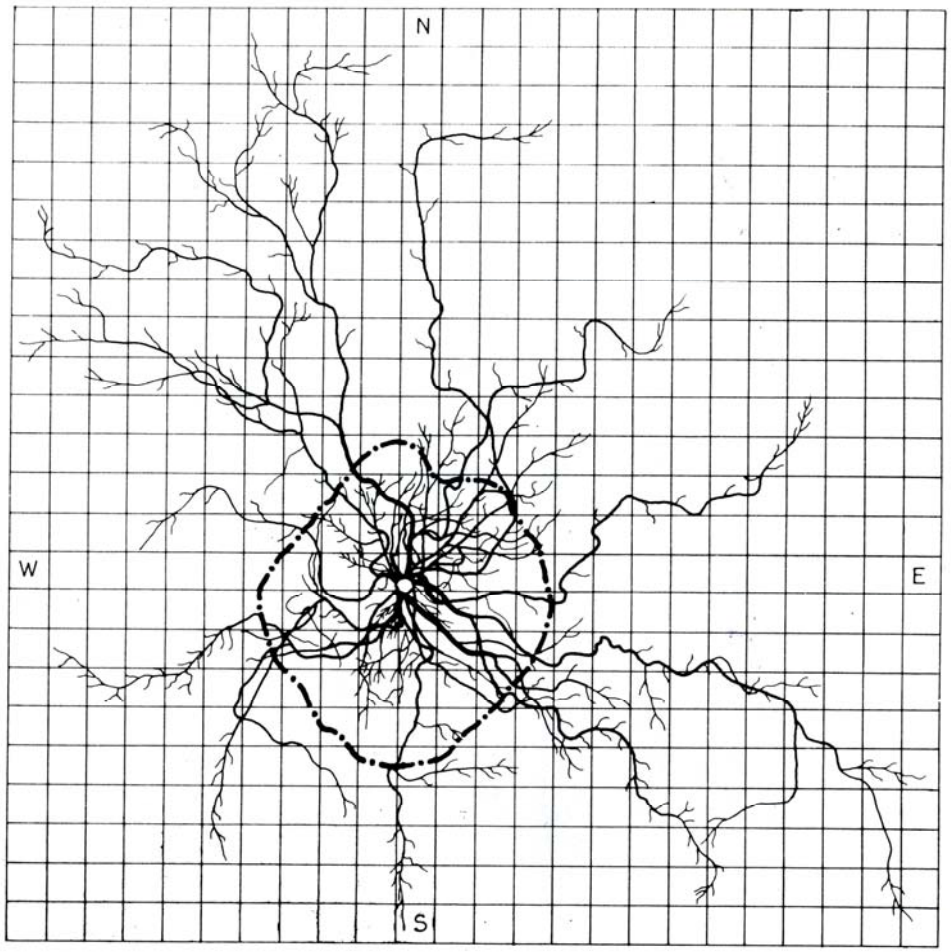


Fig. 131. The root system of a 24-year-old walnut tree raised from seed in sandy soil occupied an area of 199 m². The diameter of the root system was 3.5 times that of the branch system. The projection of the crown (drip-line) is marked by a dashed line. (The sides of the squares are 1 m)

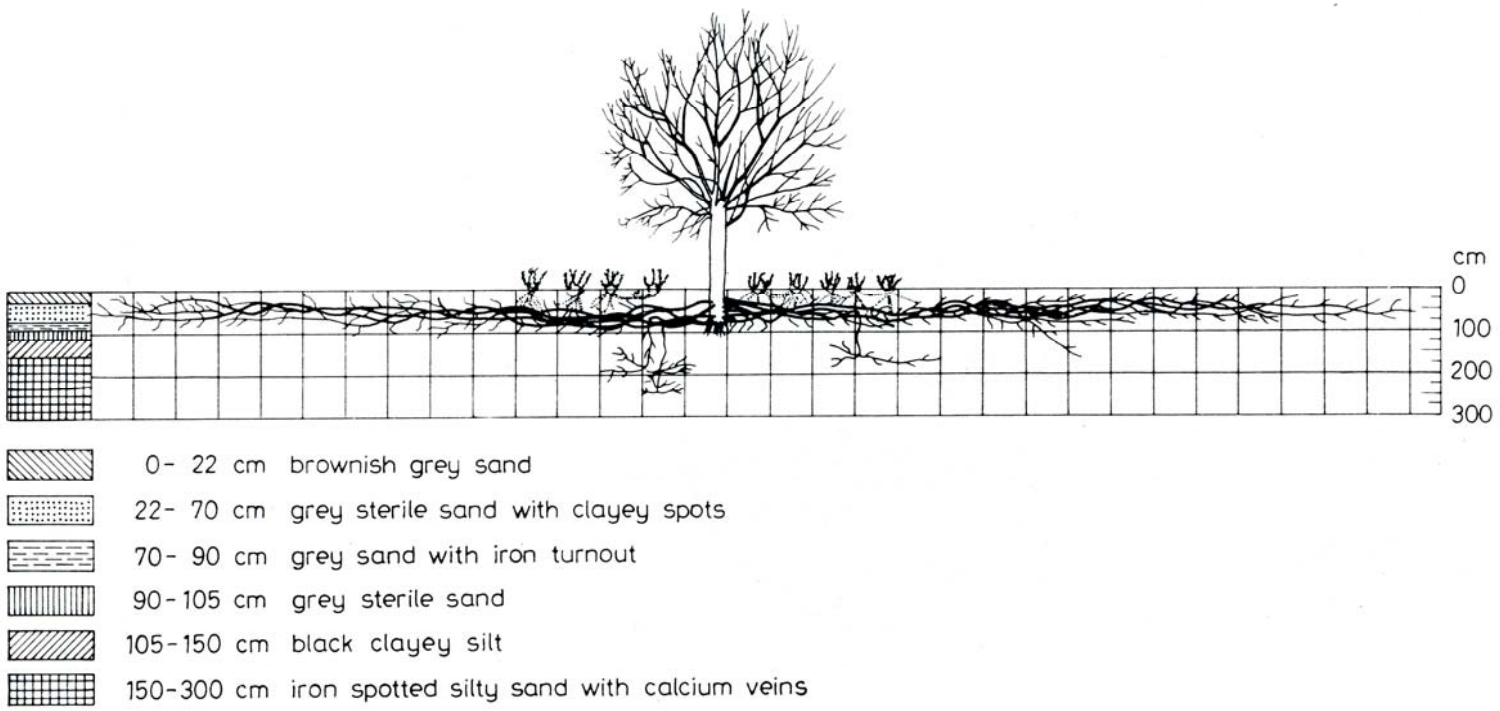


Fig. 132. The great majority (91.75 per cent) of roots of a 24-year-old walnut tree raised from seed in sandy soil was located in the 20–80 cm soil horizon. (The sides of the squares are 1 m)

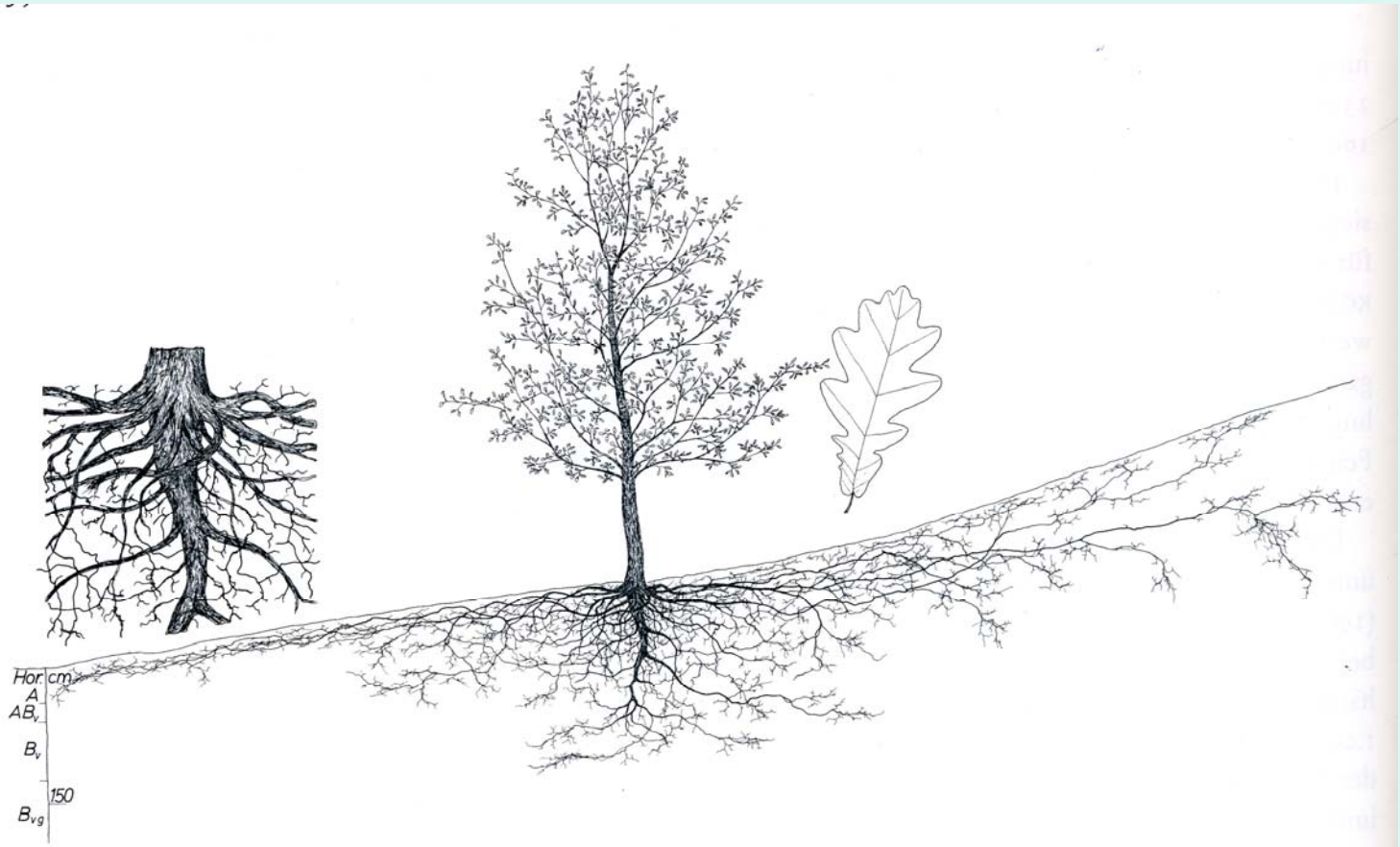


Abb. 112: Stiel-Eiche, *Quercus robur*, H–T–S = 565–200–1.450 cm, Keutschach, Kärnten, gegen das Moor auslaufende, leicht nach Süden geneigte Niederterrasse, 515 m NN. Hangmolinietum am Moorrand mit Traubenkirsche und vereinzelt Stiel-Eiche. Grundfeuchte Braunerde, Bodenprofil Hor.: A_1 0–15 cm Rasenfilz, stark humoser, sandiger Lehm, krümelig, pH 5,8, stark durchwurzelt, A_2 15–40 cm stark humoser s L, krümelig, mäßig dicht, schwach steinig, stark durchwurzelt, AB_v 40–60 cm schwach humoser s L, mäßig dicht, steinig, stark durchwurzelt, B_v 60–120 cm s L, mäßig dicht, schwach steinig, nach unten zunehmend feuchter, Durchwurzelung abnehmend, $B_{v\,g}$ s L, mäßig dicht, rostfleckig, Durchwurzelung auslaufend, Grundwasserstand zur Zeit der Freilegung bei 130 cm Tiefe.

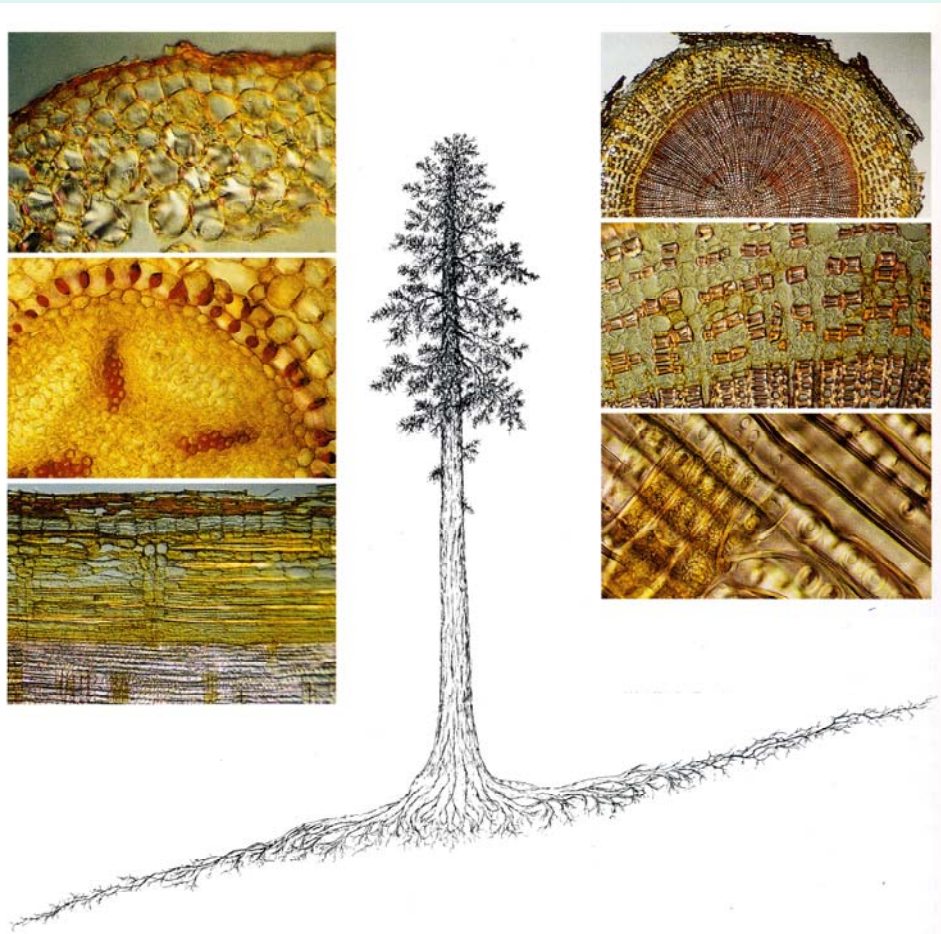


Abb. 52: Mammutbaum, *Sequoiadendron giganteum*, Höhe des Baumes 58 m, Sequoia-Nationalpark, Kalifornien, Seehöhe 2.150 m. Kiefern-Tannen-Wald mit Gruppen von Mammutbäumen. Bewurzelung aufgrund von Studien an entwurzelten Bäumen und von dortigen Beschreibungen schematisch hinzugezeichnet. **Anatomische Bilder: 1–6:** Mariabrunn, Wien, 27. 12. Ph/HCl. Links: – **1:** Prim., Ø, 162x. **Rinde** ARP 2- bis mehrschichtig, RP ZW mit Verdickungsleisten. – **2:** Prim., Ø, 162x. **Rinde** innerste Schicht PhiZ, En mit Suberinlamelle. ZZ 4arch. – **3:** Sek., ⊠, 64x. **PCAG** bis 8schichtig, F in 7 Kreisen angeordnet. Rechts: – **4:** Sek., Ø, 25x. **PCAG** bis 8schichtig, **Bast** F in bis zu 8 Kreisen angeordnet. **Holz**, Strahlen einreihig, **ZZ** 4arch. – **5:** Ausschnitt aus 4. 162x. **Bast** F rektangulär, W verholzt. – **6:** Ausschnitt aus 3. 409x. **Holz**, Tracheiden mit Hoftüpfeln und zulaufendem Ende, im Kreuzungsfeld Tüpfel unbehöft.

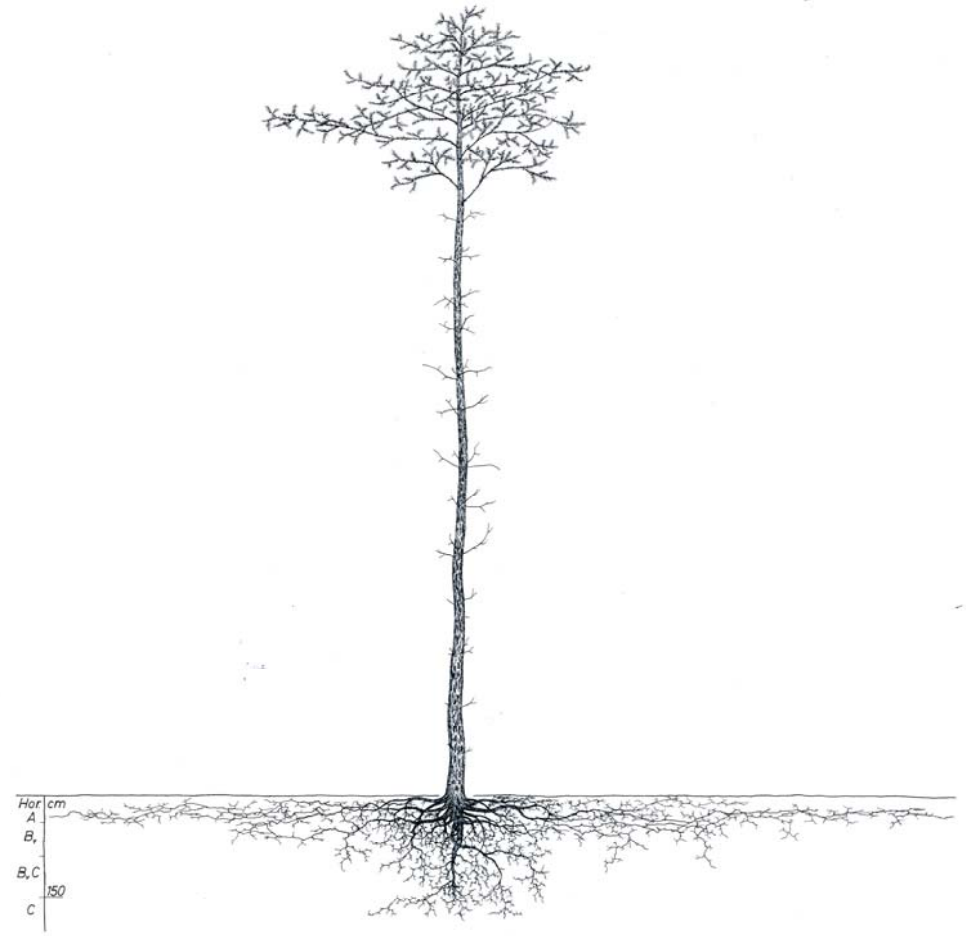
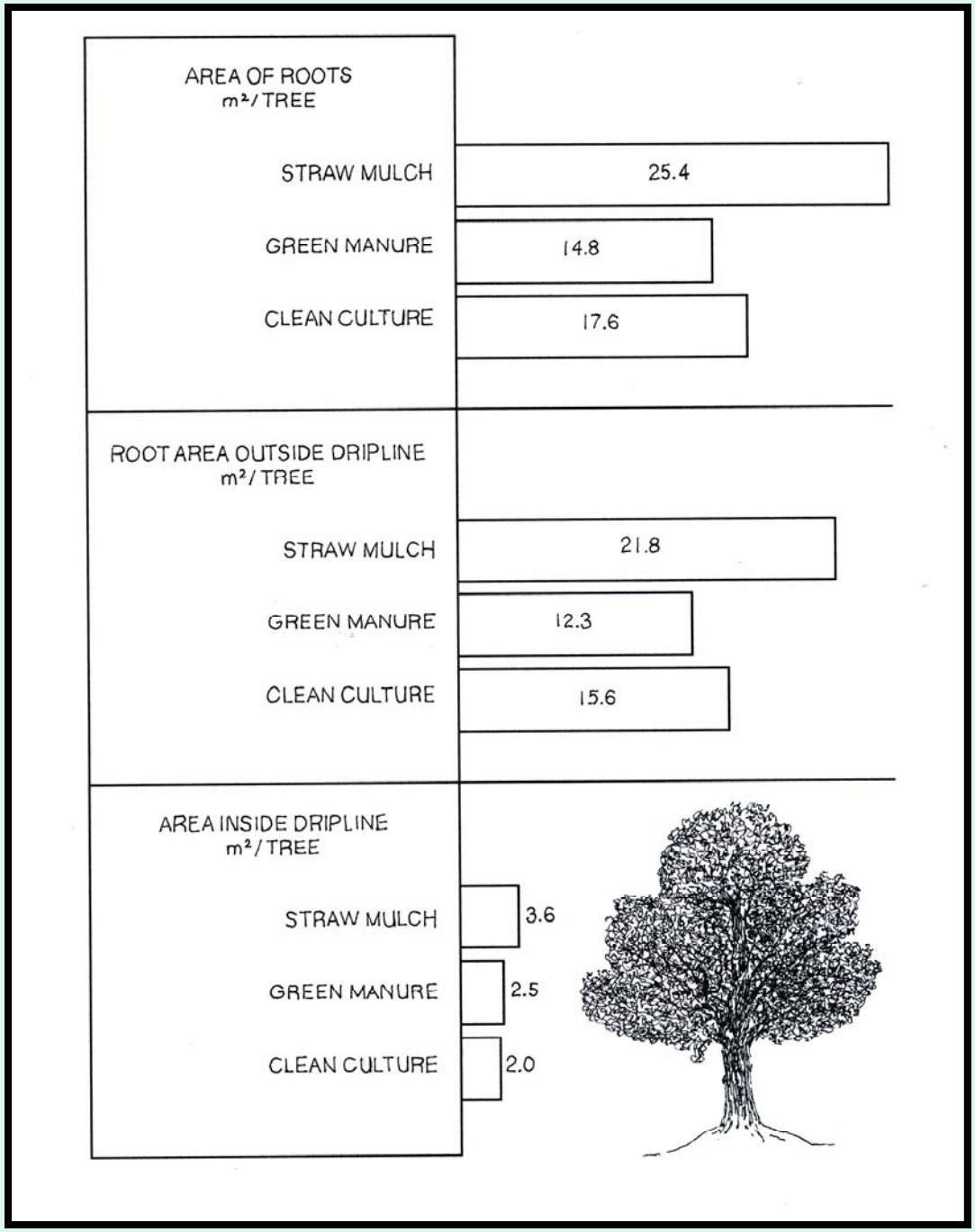
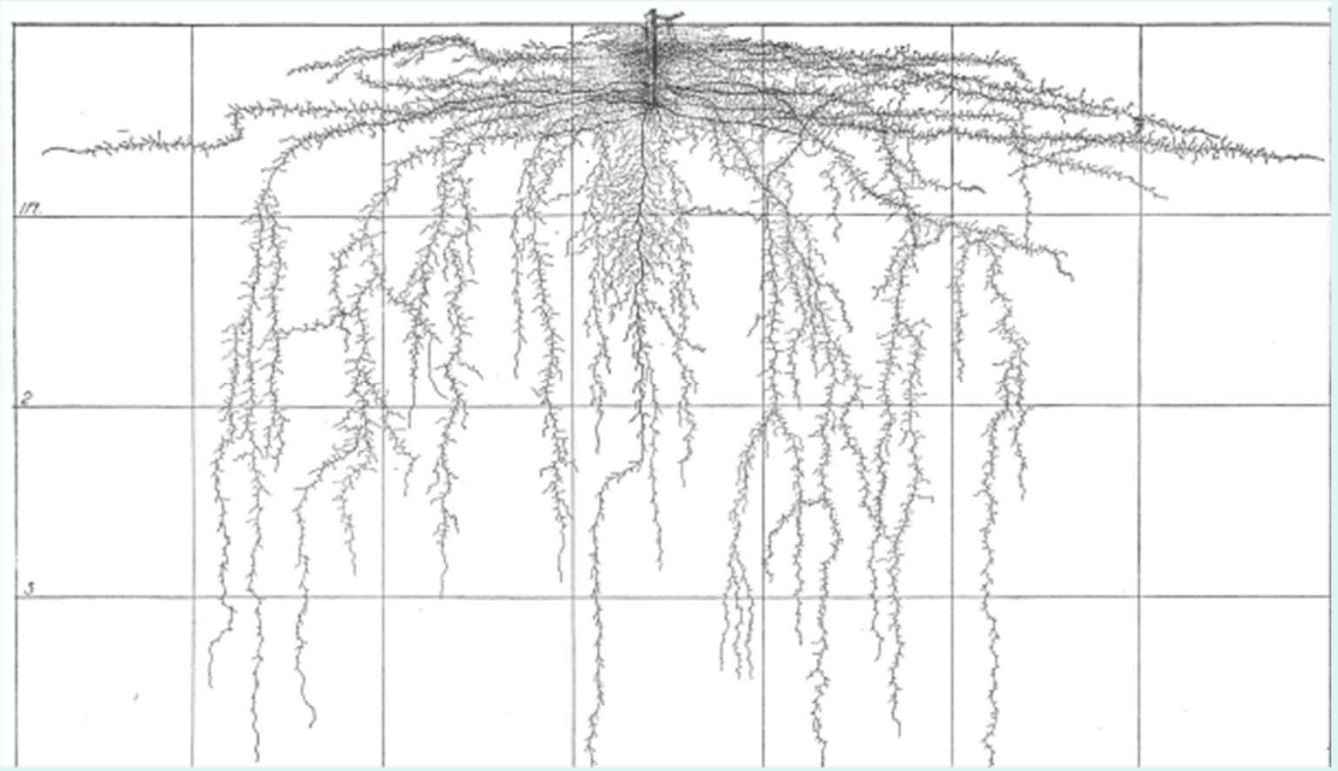


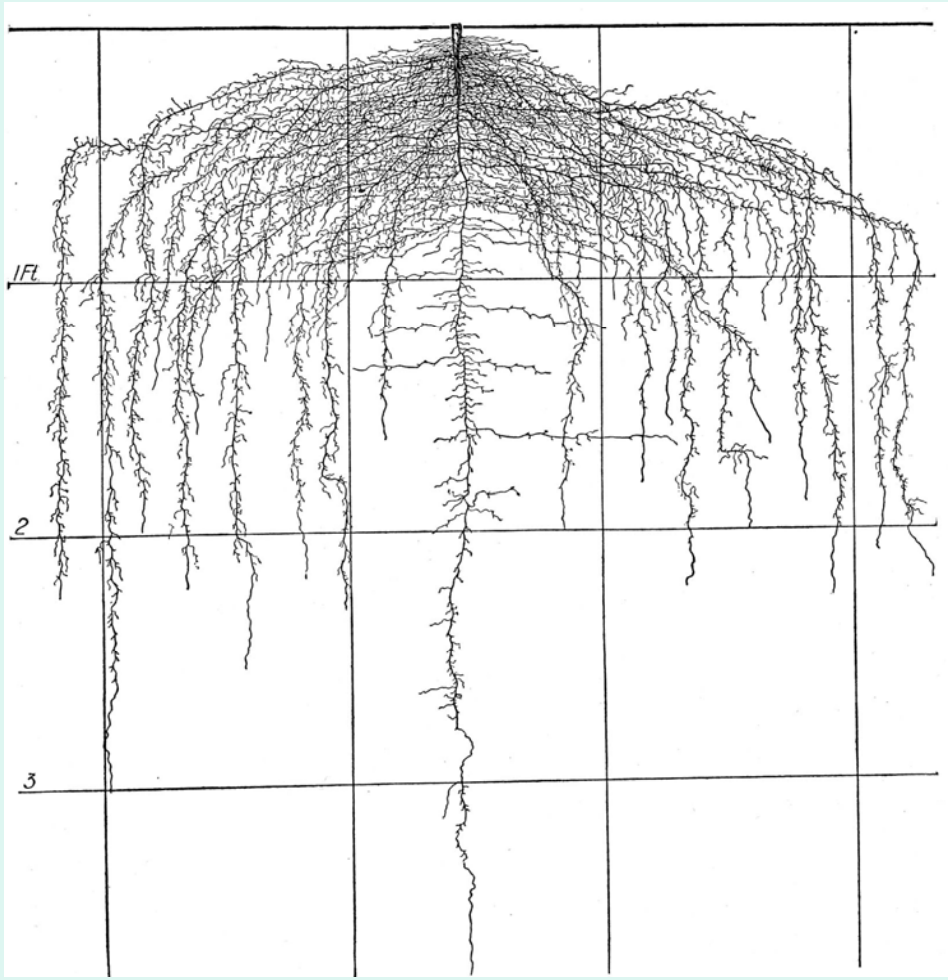
Abb. 30: Wald-Kiefer, *Pinus sylvestris* subsp. *sylvestris*, H–T–S = 1.173–180–1.340 cm, nahe Klagenfurt, eben, 450 m NN. Eichen-Hainbuchen-Wald mit vereinzelten Kiefern. Lockersediment-Braunerde über Niederterrasse, Bodenprofil Hor.: A_1 0–10 cm stark humoser, lehmiger Sand, krümelig, locker, stark durchwurzelt, A_2 10–39 cm humoser l S, kiesig, locker, stark durchwurzelt, B_v 39–90 cm l S, stärker kiesig-schotterig, locker, mäßig stark durchwurzelt, B_vC 90–150 cm l S, sehr steinig, locker, Durchwurzelung stark abnehmend, C Sand, Kies und Schotter, sehr locker, Durchwurzelung auslaufend, ab 150 cm Tiefe schwach grundfeucht.

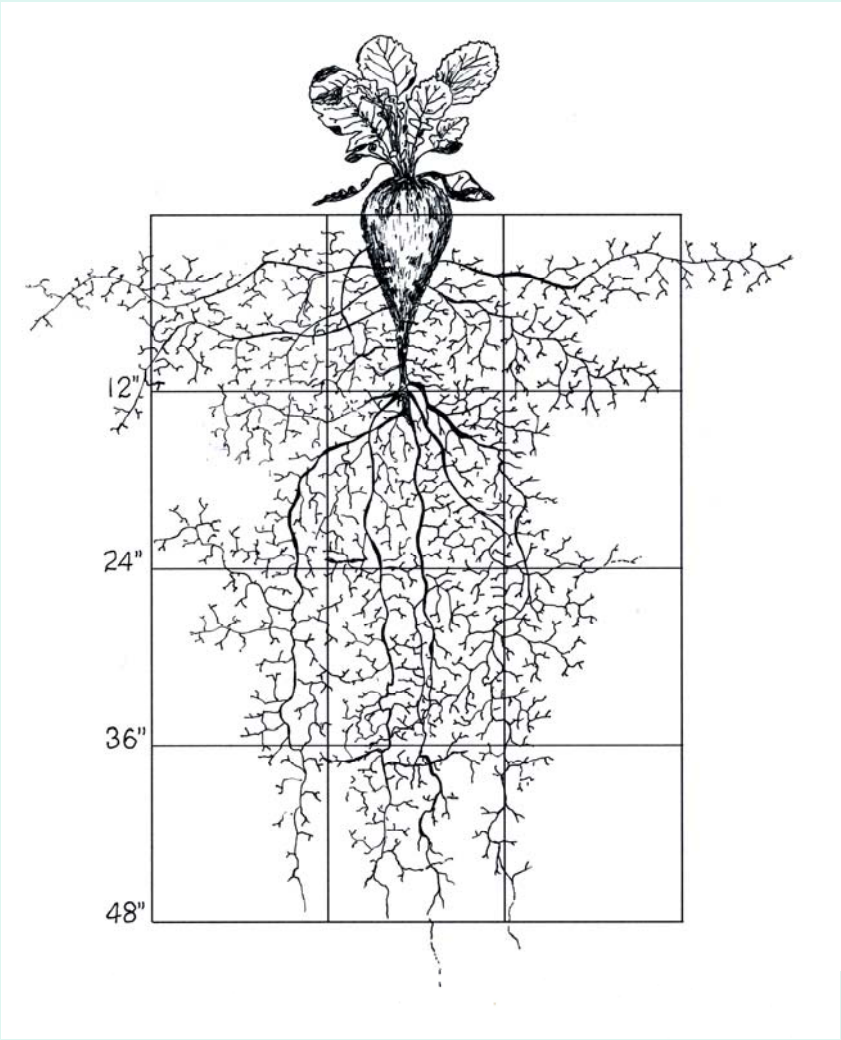

AREA OF ROOTS
m²/TREE
STRAW MULCH
25.4
GREEN MANURE
14.8
CLEAN CULTURE
17.6
ROOT AREA OUTSIDE DRIPLINE
m²/TREE
STRAW MULCH
21.8
GREEN MANURE
12.3
CLEAN CULTURE
15.6
AREA INSIDE DRIPLINE
m²/TREE
STRAW MULCH
3.6
GREEN MANURE
2.5
CLEAN CULTURE
2.0

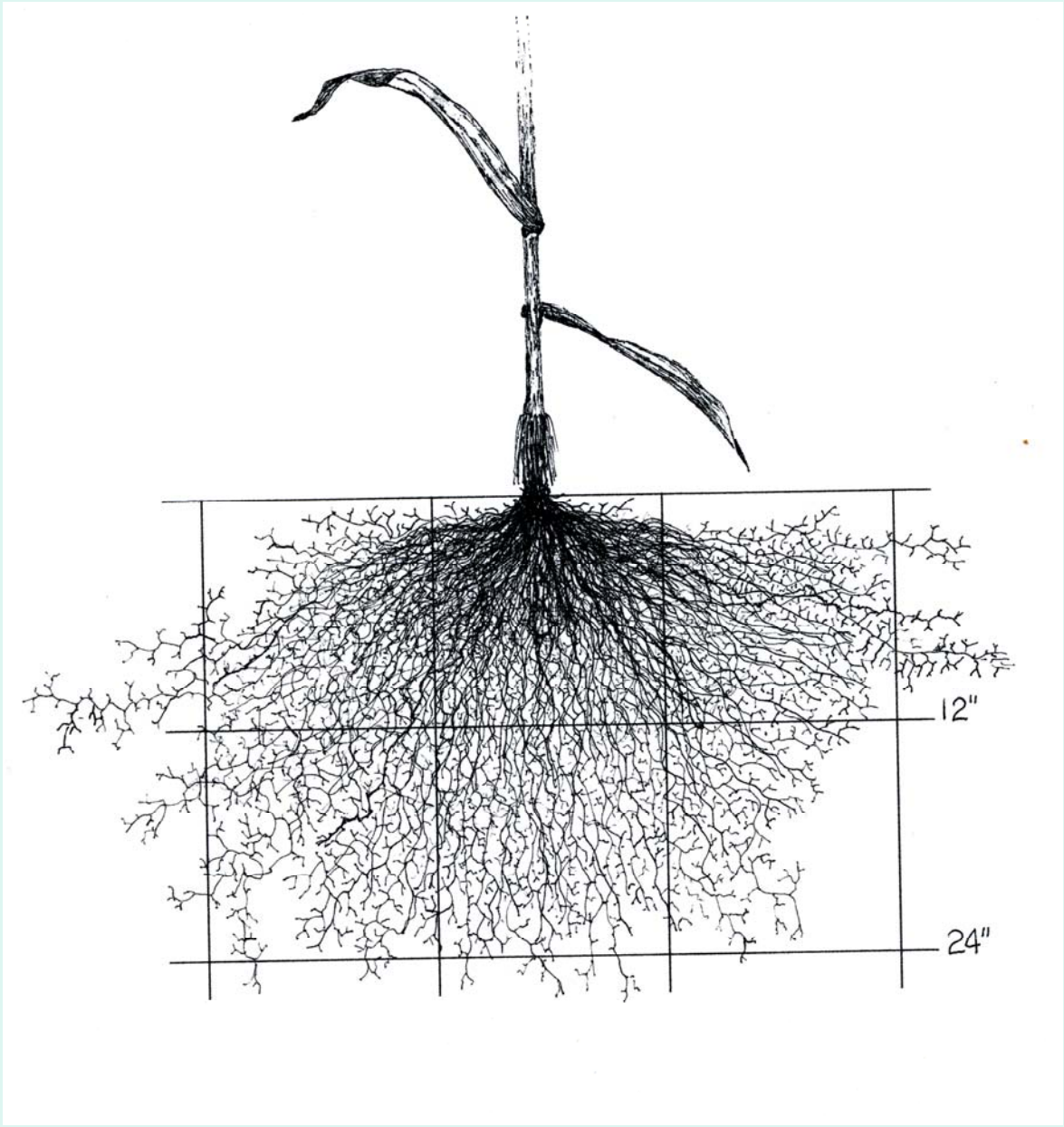
Tomato



Lettuce




12"
24"
36"
48"


12"
24"

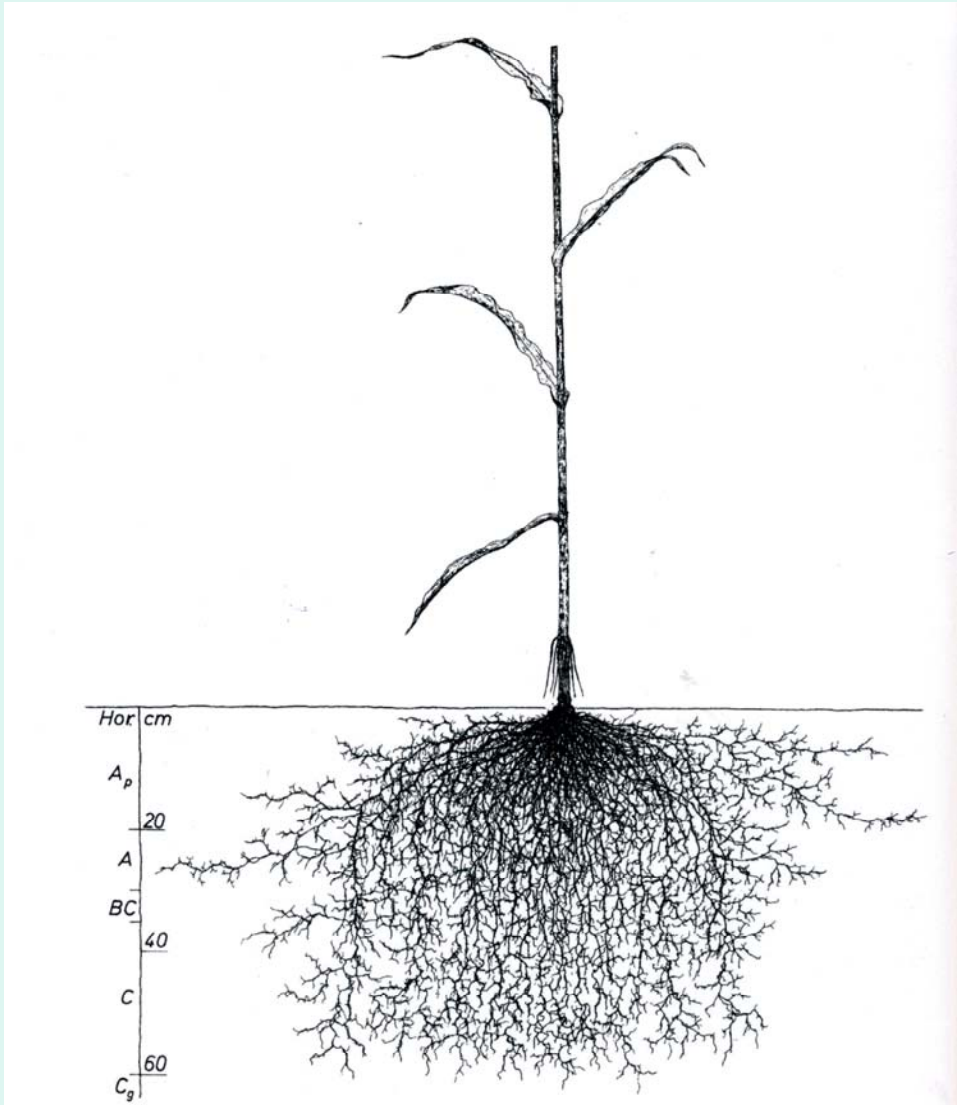


Abb. 17: Silo-Mais, *Zea mays,* H–T–S = 300–60–126 cm, Maria Saal, Kärnten, 505 m NN, 15.07.2003. Bestand mit viel Blut-Fingerhirse, *Digitaria sanguinalis* und Hühnerhirse, *Echinochloa crus-galli*. Gleyauboden, Schotter, Bodenprofil Hor.: A_{p1} 0–7 cm humoser feinsandiger Schluff, dunkel graubraun (10YR4/2), feinkrümelig, sehr stark durchwurzelt, A...

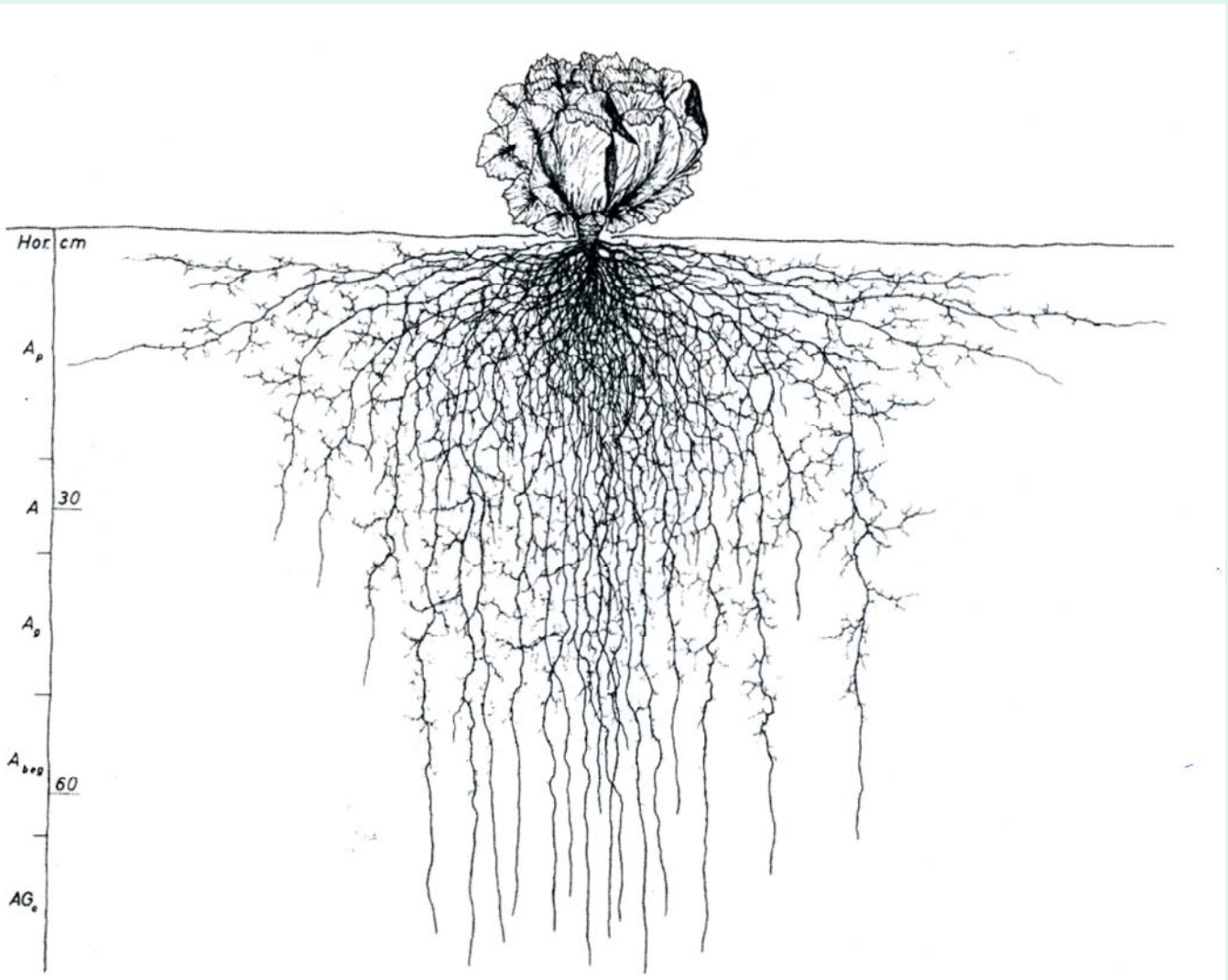


Abb. 151: Kopfsalat, *Lactuca sativa* var. *capitata*, H–T–S = 20–80–114 cm, Lendorf bei Klagenfurt, 452 m NN, 21.07.2003. Gleyboden, oben mineralischer Gleyboden, unten Anmoorgley, Stockwerkprofil durch Verlandung, Bodenprofil Hor.: A_{p1} 0–5 cm humoser feinsandiger Schluff, tief dunkelgrau (10YR3/1), locker, stark durchwurzelt, A_{p2} 5–25 cm h fs Schluff, dicht, blockig, gut durchwurzelt, A 25–35 cm h fs Schluff, dicht, blockig, gut durchwurzelt, A_g 35–50 cm schwach h fs Schluff, tief dunkel graubraun (10YR3/2), dicht, feuchter, schwach rostfleckig, Durchwur-

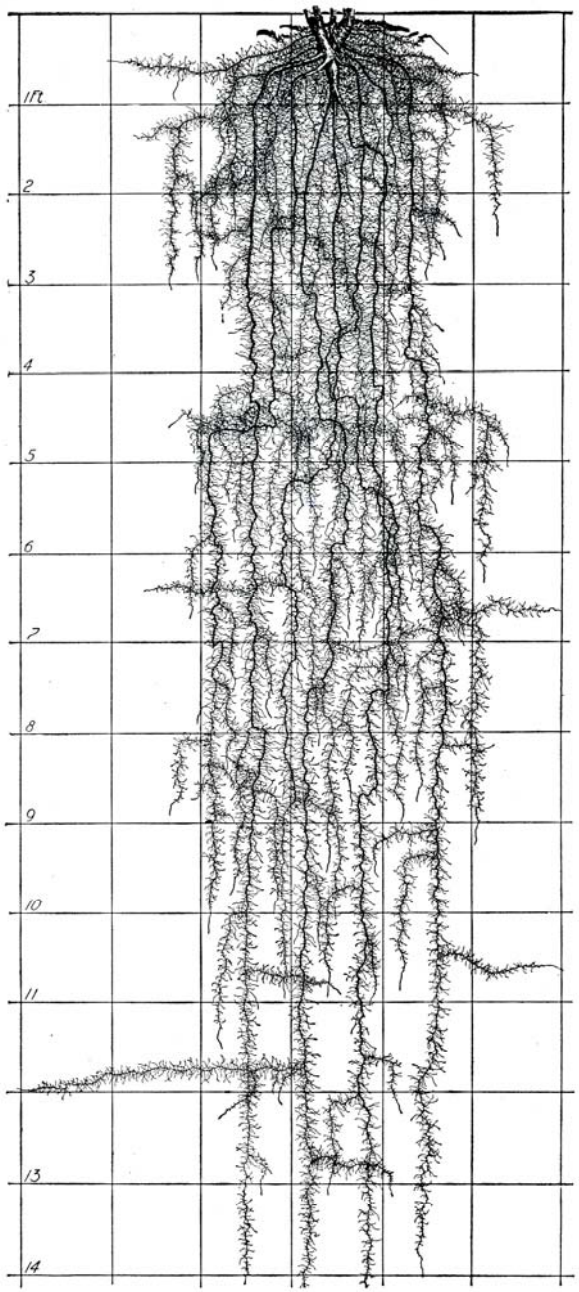
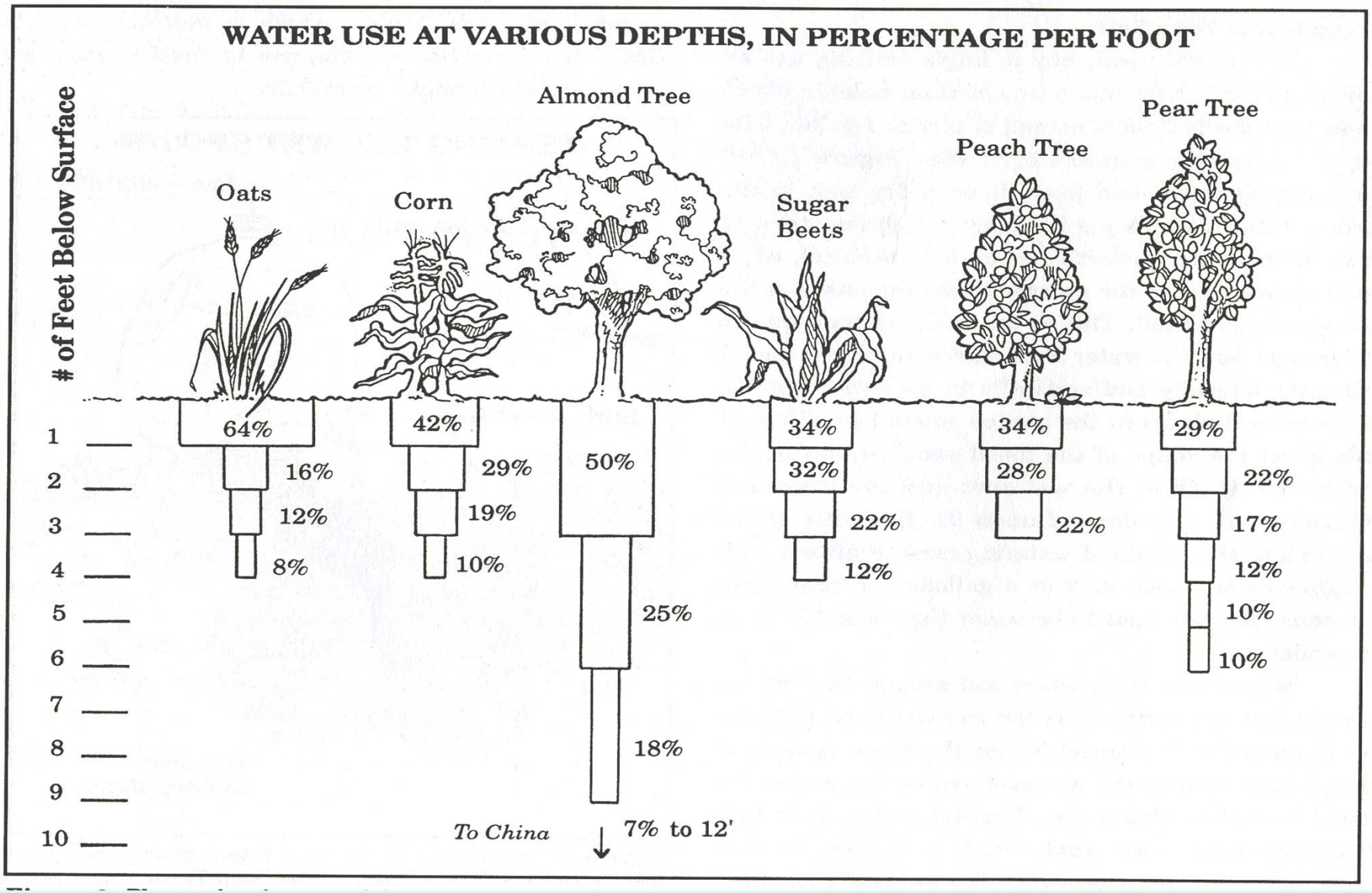
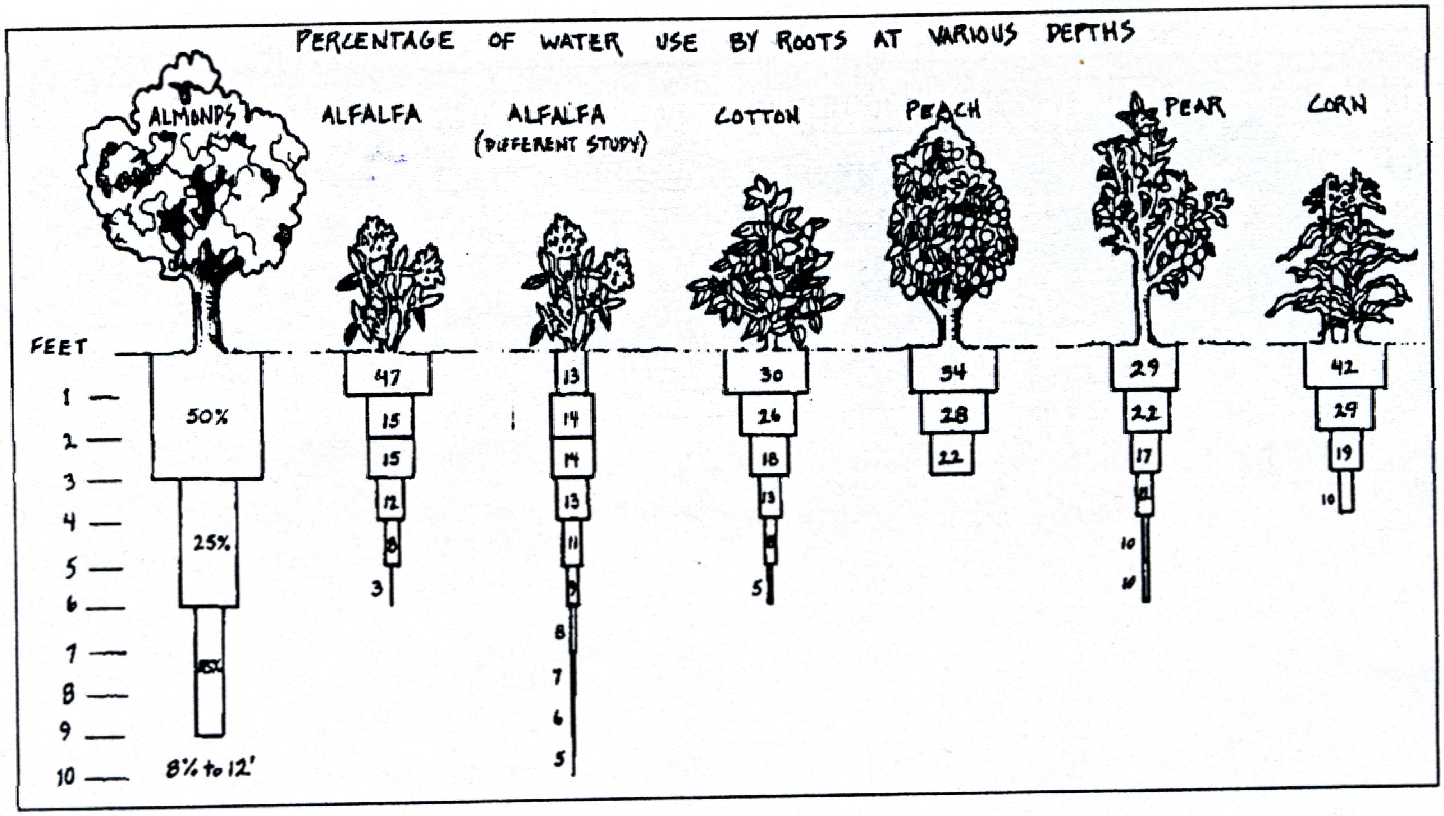
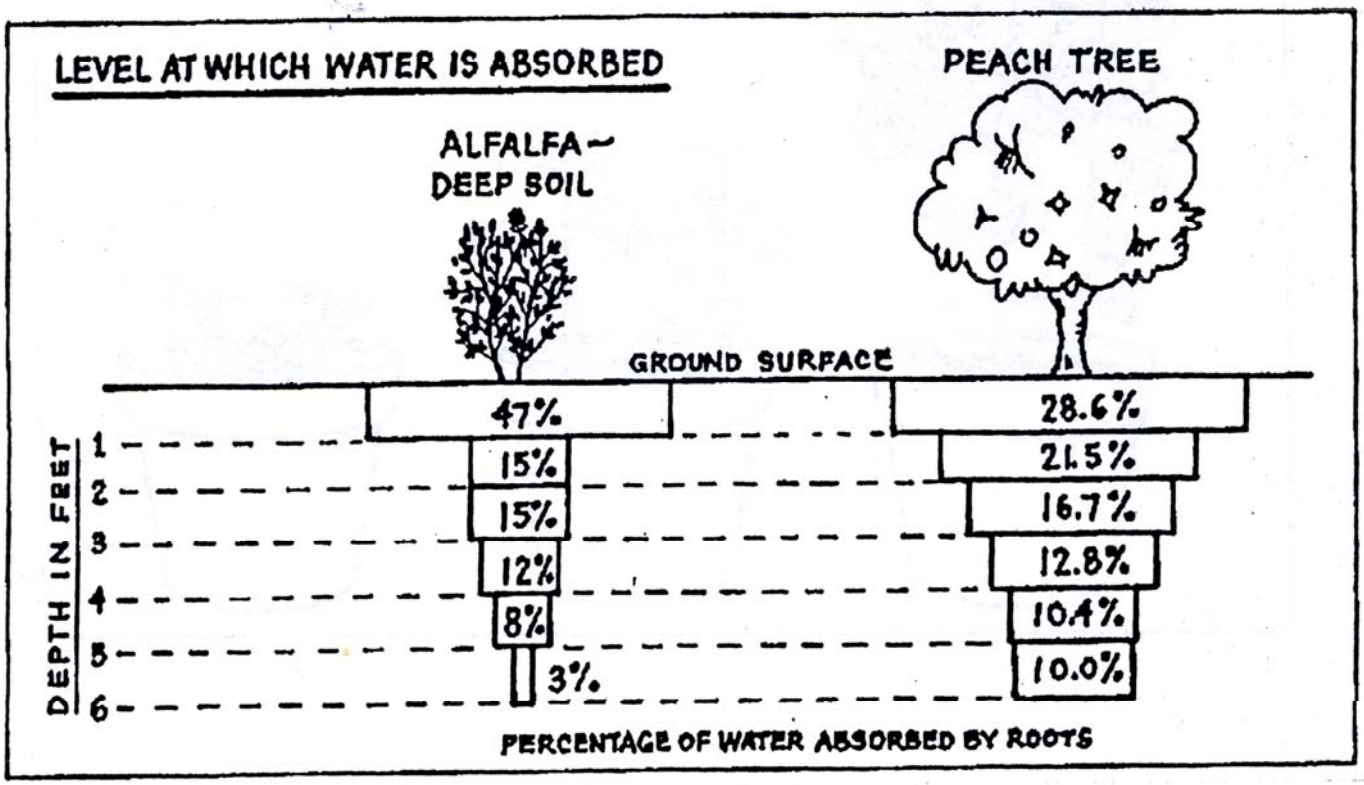
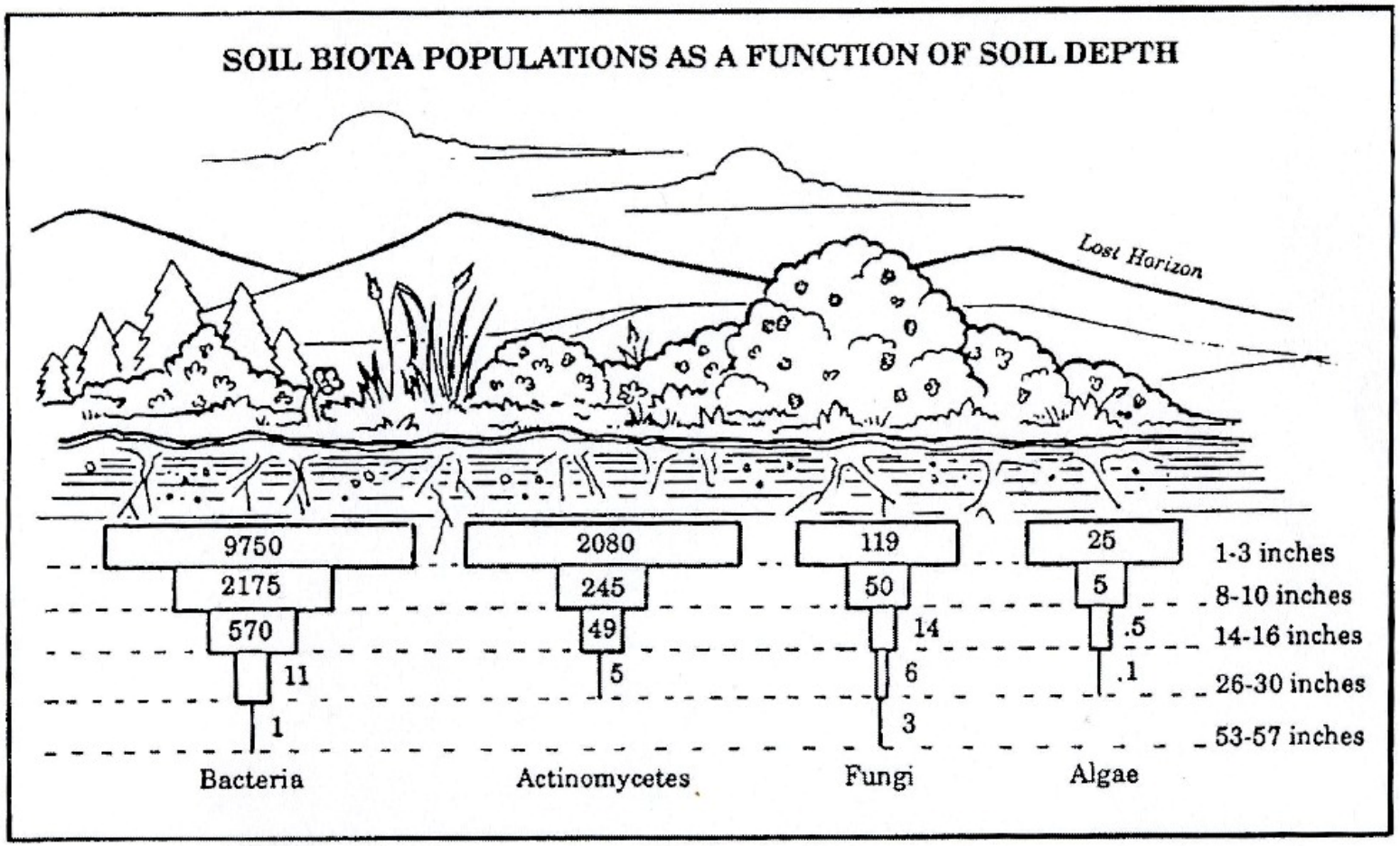


FIG. 45.—Mature root system of a 10-year-old plant of horse-radish.

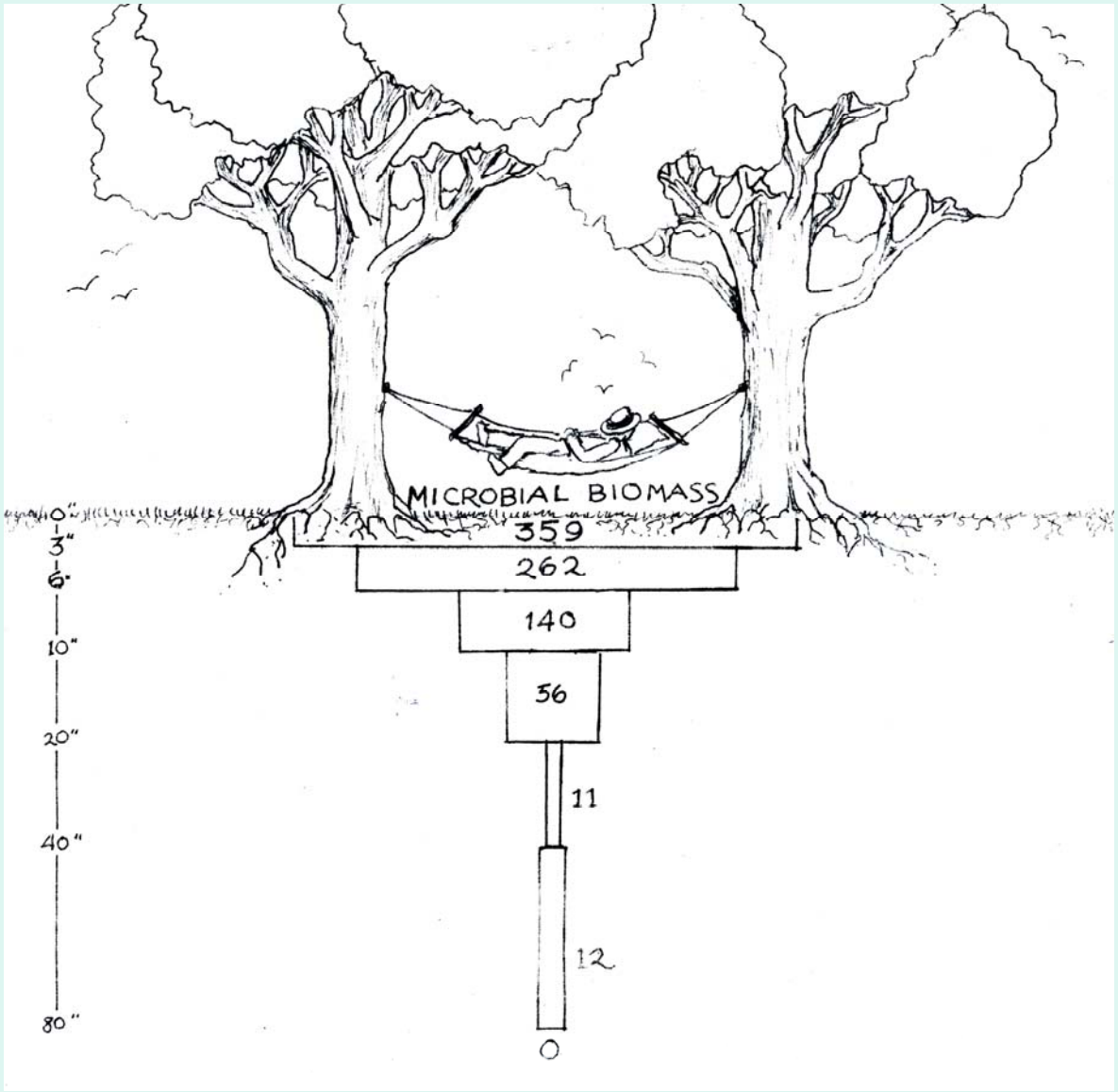

WATER USE AT VARIOUS DEPTHS, IN PERCENTAGE PER FOOT
# of Feet Below Surface
1
2
3
4
5
6
7
8
9
10
Oats
64%
16%
12%
8%
Corn
42%
29%
19%
10%
Almond Tree
50%
25%
18%
To China
7% to 12'
Sugar Beets
34%
32%
22%
12%
Peach Tree
34%
28%
22%
Pear Tree
29%
22%
17%
12%
10%
10%

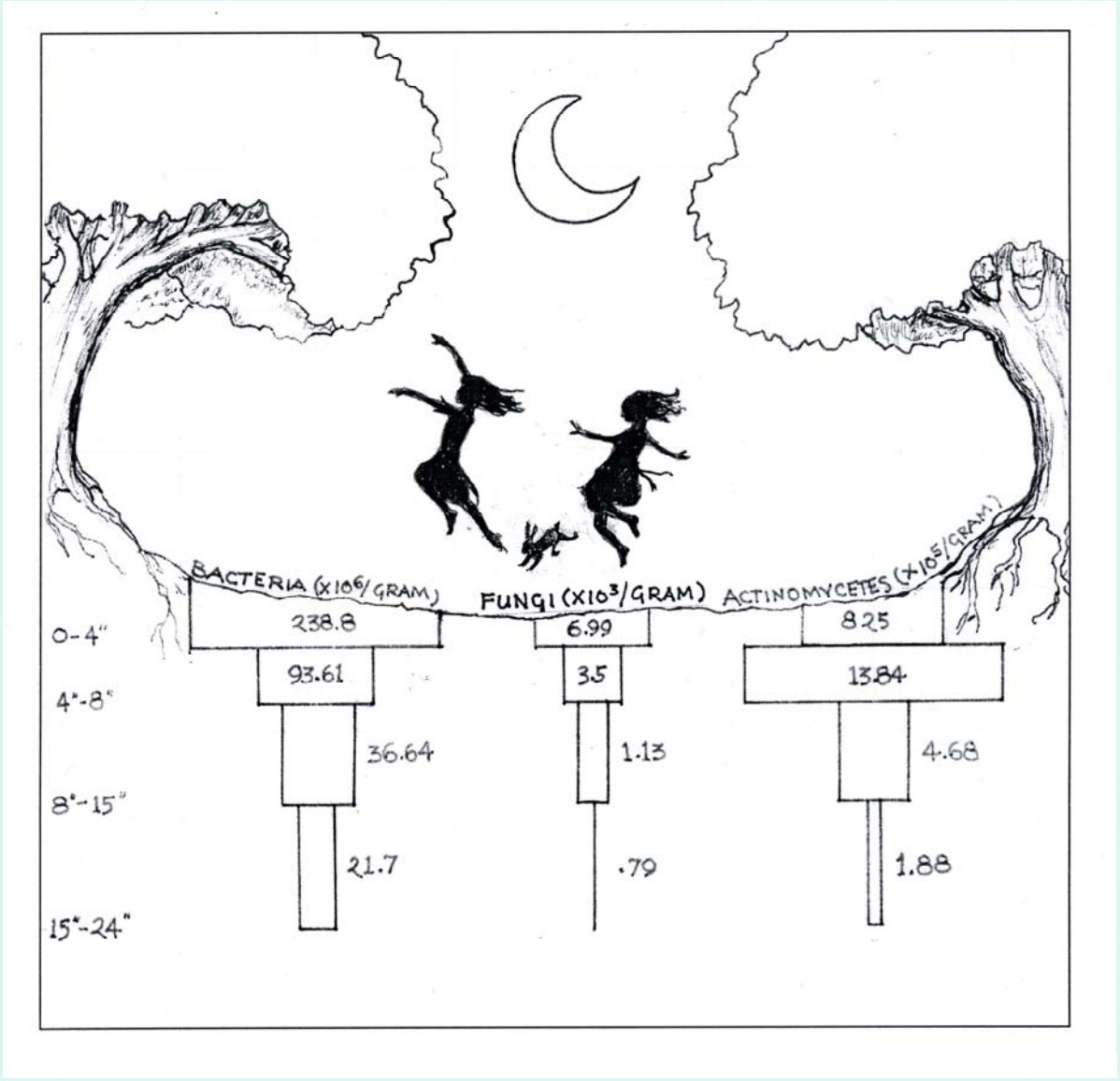

PERCENTAGE OF WATER USE BY ROOTS AT VARIOUS DEPTHS
ALMONDS
ALFALFA
ALFALFA
(DIFFERENT STUDY)
COTTON
PEACH
PEAR
CORN
FEET
1
2
3
4
5
6
7
8
9
10
50%
25%
8% to 12'
47
15
15
12
3
13
14
14
13
11
8
7
6
5
30
24
18
13
5
34
28
22
29
22
17
10
10
42
29
19
10

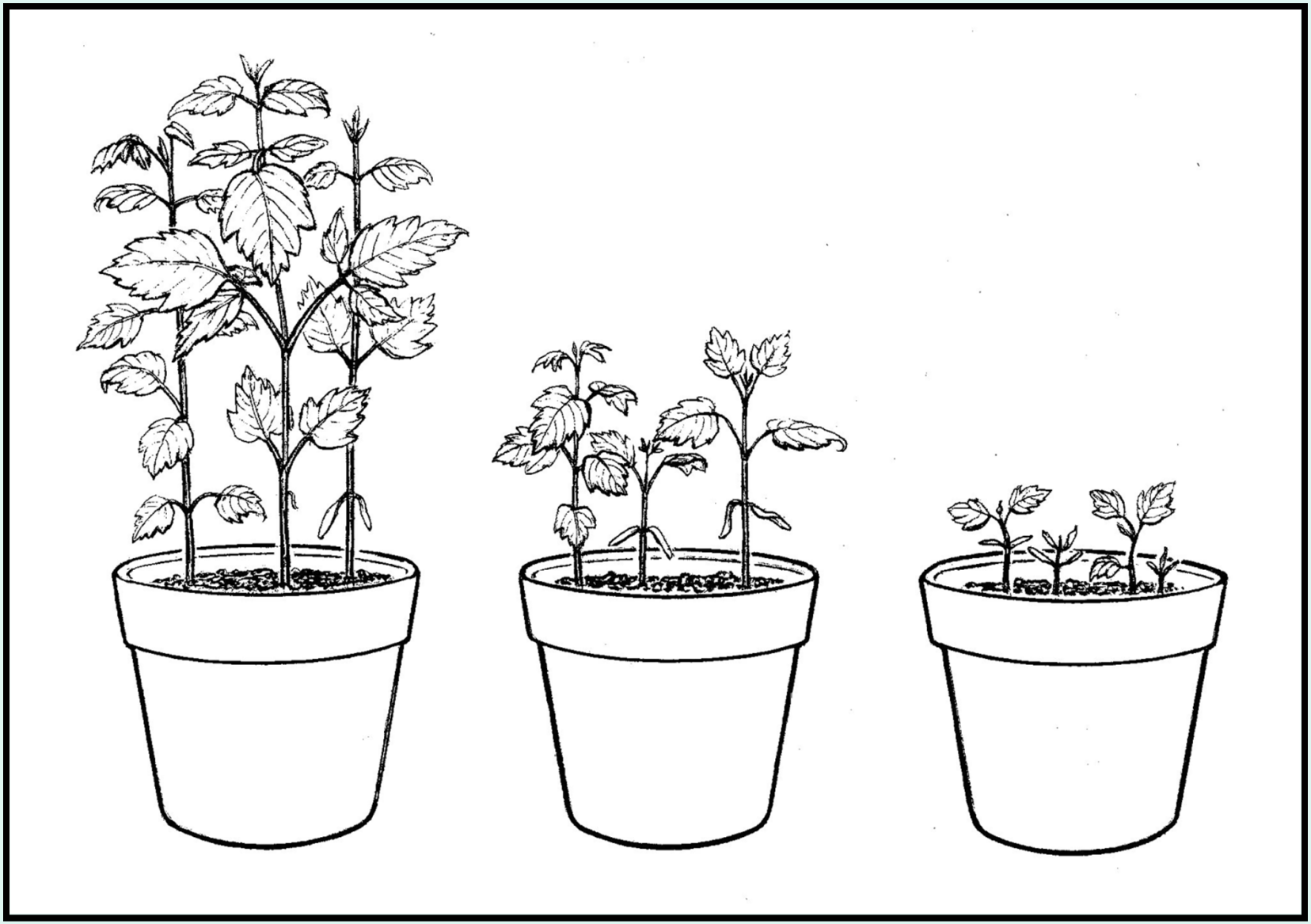

LEVEL AT WHICH WATER IS ABSORBED
ALFALFA – DEEP SOIL
PEACH TREE
GROUND SURFACE
47%
15%
15%
12%
8%
3%
28.6%
21.5%
16.7%
12.8%
10.4%
10.0%
DEPTH IN FEET
1
2
3
4
5
6
PERCENTAGE OF WATER ABSORBED BY ROOTS



This illustration shows how dramatic the difference is between the surface-loving soil life and soil life just a bit deeper. Tillage disrupts this natural layering until the various "crittters" have a chance to repopulate the level of soil they prefer the most.

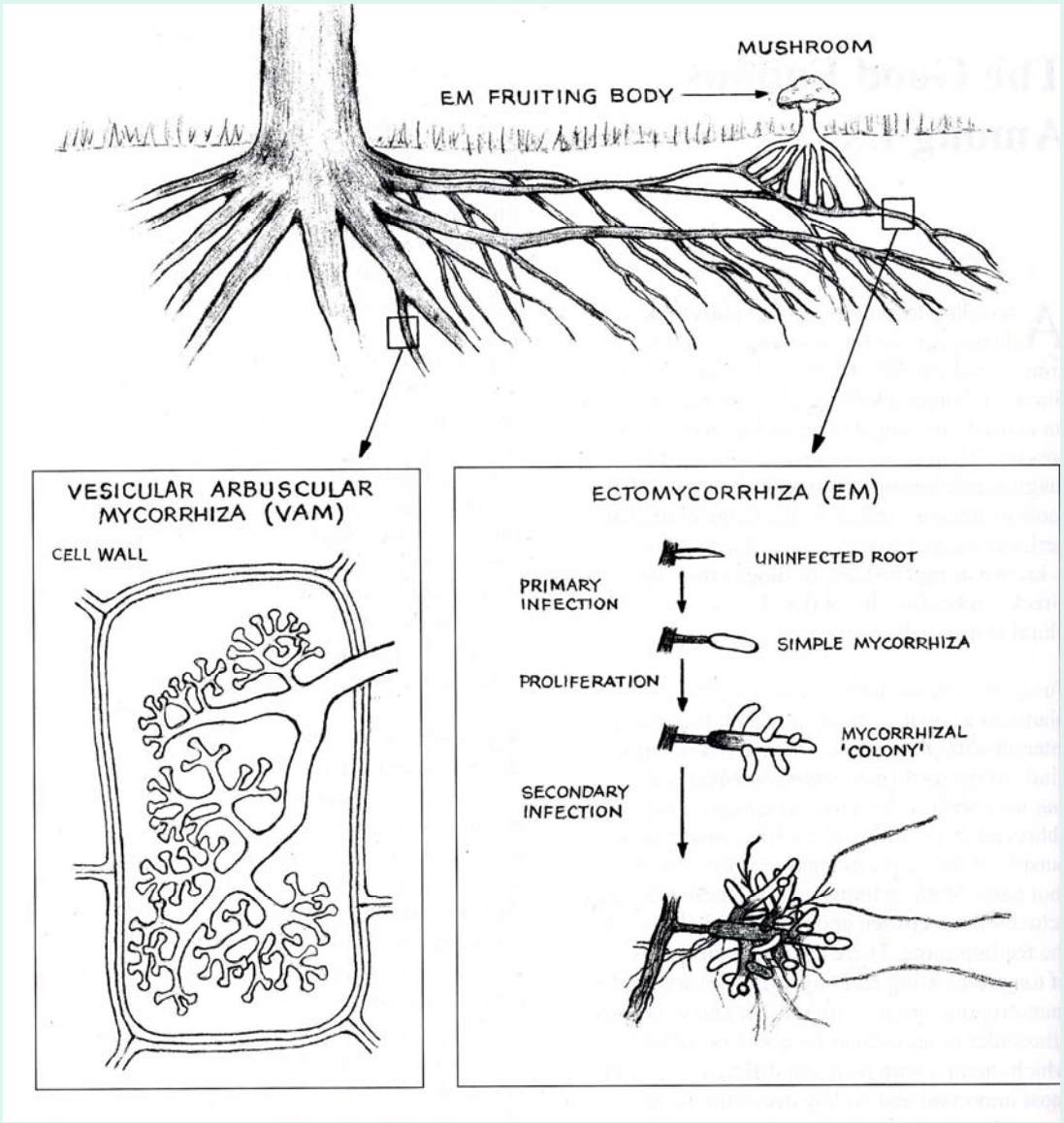

MICROBIAL BIOMASS
0"
3"
6"
10"
20"
40"
80"
359
262
140
56
11
12
0

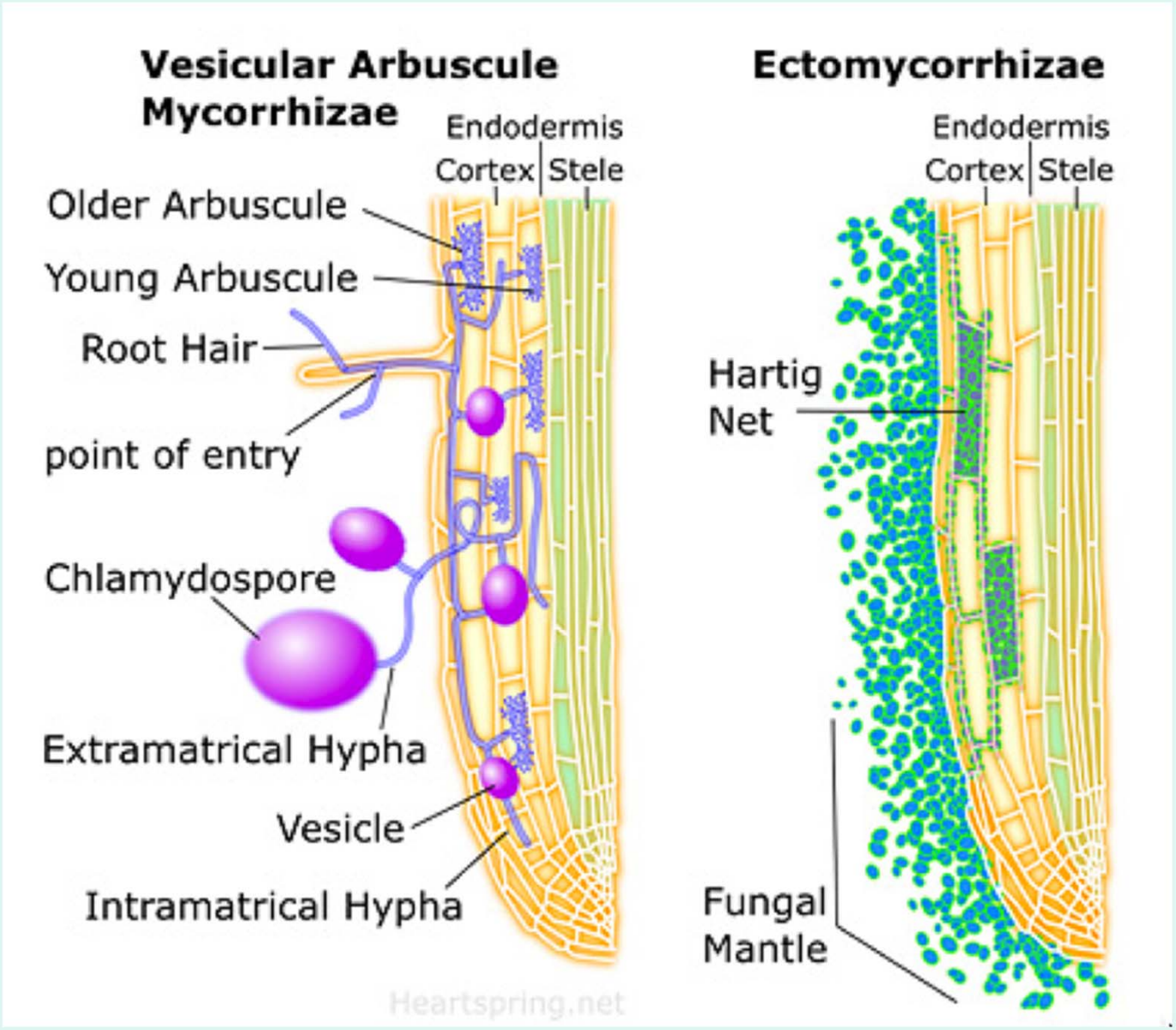

BACTERIA (X10⁶/GRAM)
FUNGI (X10³/GRAM)
ACTINOMYCETES (X10⁵/GRAM)
0-4"
4"-8"
8"-15"
15"-24"
238.8
93.61
36.64
21.7
6.99
3.5
1.13
.79
8.25
13.84
4.68
1.88



1-2 inches 2-4 inches subsoil

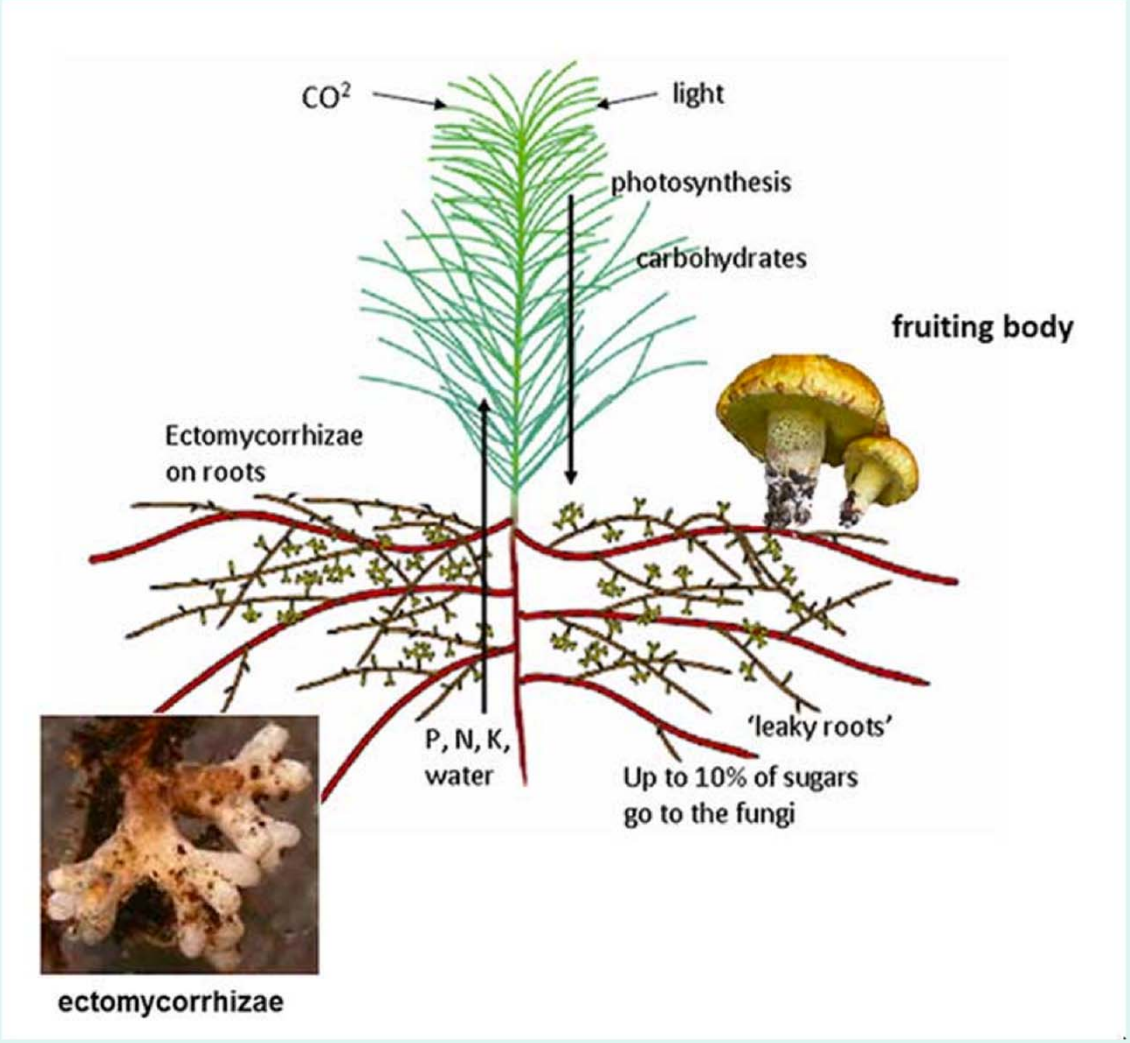
Endo- & Ectomycorrhizae

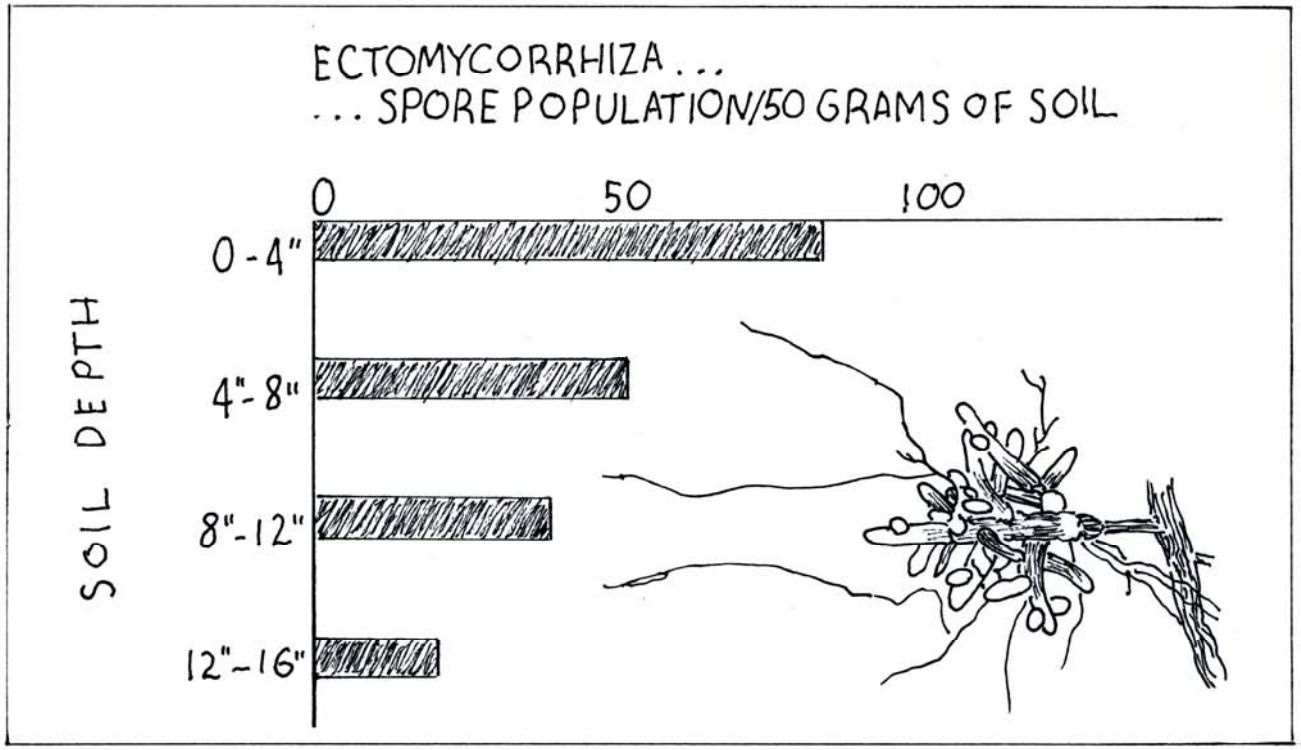


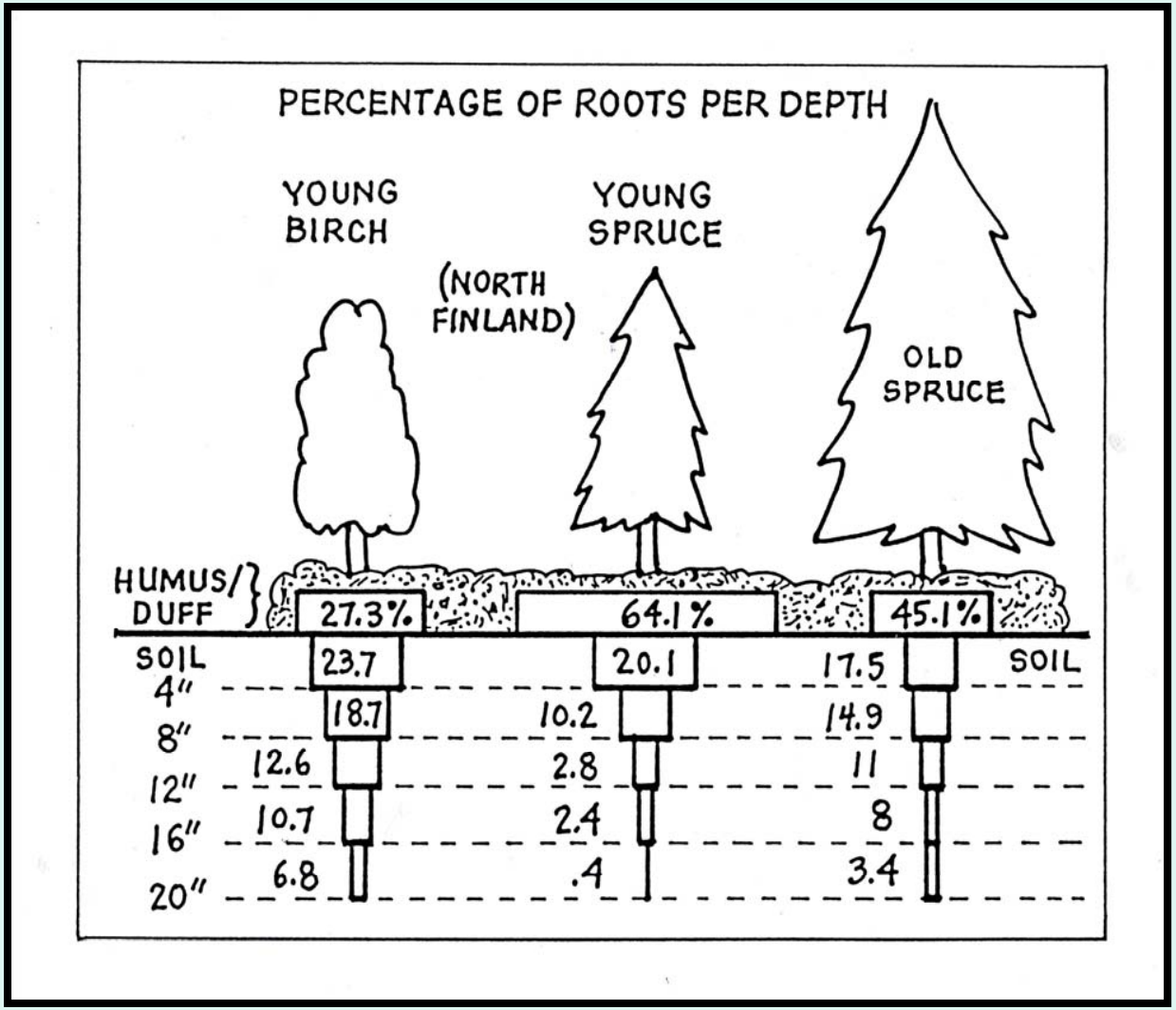

Vesicular Arbuscule Mycorrhizae
Endodermis
Cortex
Stele
Older Arbuscule
Young Arbuscule
Root Hair
point of entry
Chlamydospore
Extramatrical Hypha
Vesicle
Intramatrical Hypha
Heartspring.net
Ectomycorrhizae
Endodermis
Cortex
Stele
Hartig Net
Fungal Mantle

Boletus piperatus

Ectomycorrhizal Association




ECTOMYCORRHIZA . . .
. . . SPORE POPULATION/50 GRAMS OF SOIL
0
50
100
SOIL DEPTH
0-4"
4"-8"
8"-12"
12"-16"


PERCENTAGE OF ROOTS PER DEPTH
YOUNG BIRCH
YOUNG SPRUCE
(NORTH FINLAND)
OLD SPRUCE
HUMUS/ DUFF
27.3%
64.1%
45.1%
SOIL
SOIL
4"
8"
12"
16"
20"
23.7
18.7
12.6
10.7
6.8
20.1
10.2
2.8
2.4
.4
17.5
14.9
11
8
3.4

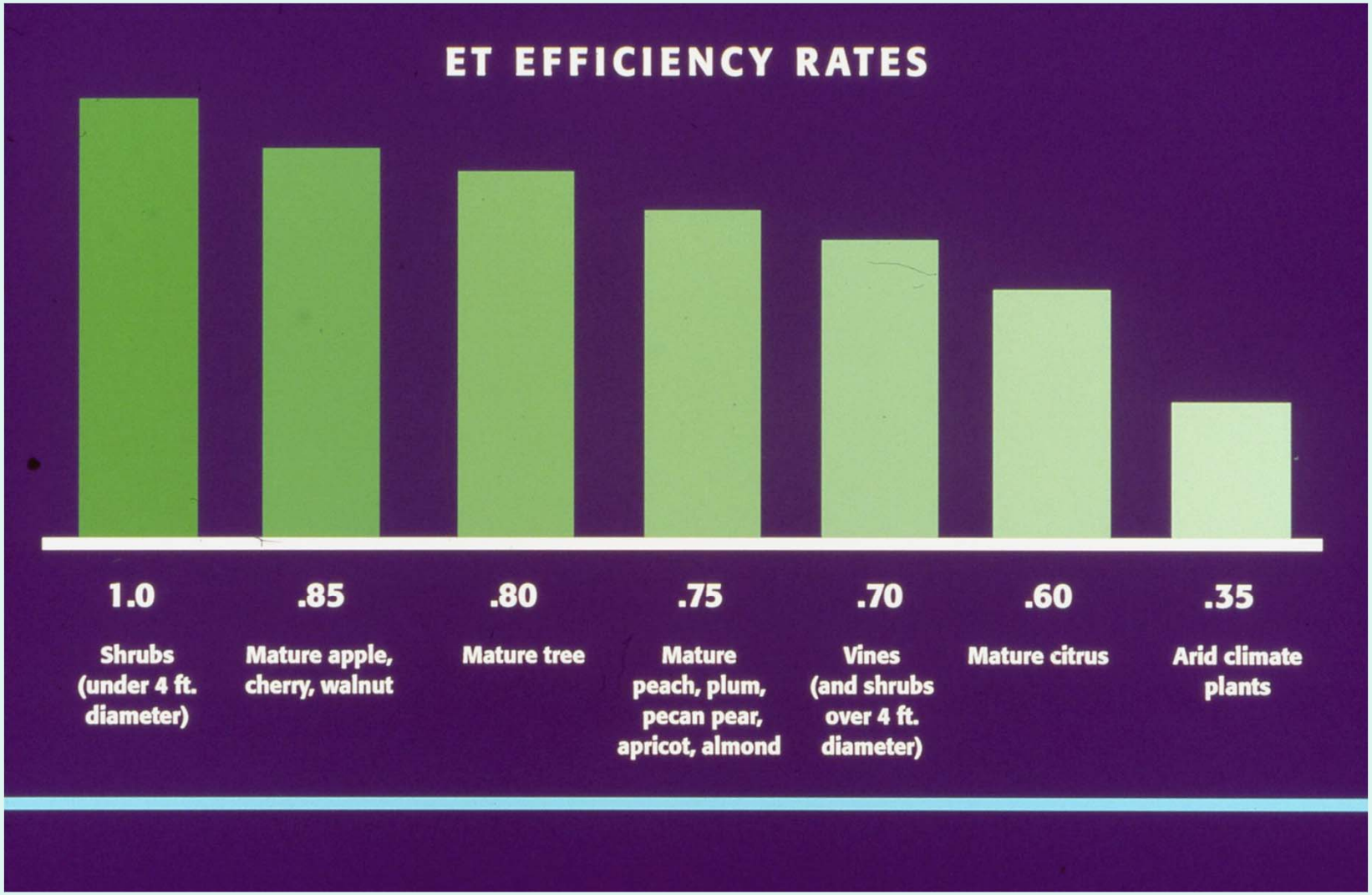
WARNING !!

MATH AHEAD

Daily Water Use (In Gallons per Day)

BASED ON VARIOUS EVAPOTRANSPIRATION RATES

Square Feet of Plant Cover	ET Rate (in inches/month)									
	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"
1 sq. ft.	0.0187	0.0374	0.062	0.083	0.104	0.125	0.145	0.166	0.187	0.208
4 sq. ft.	0.075	0.15	0.248	0.332	0.416	0.5	0.58	0.664	0.75	0.832
10 sq. ft.	0.187	0.374	0.62	0.83	1.04	1.25	1.45	1.66	1.87	2.08
75 sq. ft.	1.403	2.805	4.65	6.225	7.8	9.4	10.875	12.45	14.0	15.6
100 sq. ft.	1.87	3.74	6.2	8.3	10.4	12.5	14.5	16.6	18.7	20.8
200 sq. ft.	3.74	7.480	12.4	16.6	20.8	25.0	29.0	33.2	37.4	41.6
300 sq.ft.	5.61	11.22	18.6	24.9	32.2	37.5	43.5	49.8	56.1	62.4
1 acre solid cover	815	1629	2701	3615	4530	5445	6316	7231	8146	9060


ET EFFICIENCY RATES
1.0
Shrubs (under 4 ft. diameter)
.85
Mature apple, cherry, walnut
.80
Mature tree
.75
Mature peach, plum, pecan pear, apricot, almond
.70
Vines (and shrubs over 4 ft. diameter)
.60
Mature citrus
.35
Arid climate plants

WUCOLS is the acronym for

Water Use Classifications of Landscape Species.

			REG
TYPE	BOTANICAL NAME	COMMON NAME	1
Gc P	Achillea tomentosa	woolly yarrow	L
P	Aconitum napellus	garden monkshood	M
P	Acorus gramineus	sweet flag	H
V	Actinidia arguta	kiwi/Tara	M
V	Actinidia deliciosa	kiwi	H
S	Adenanthos drummondii	woolly bush	?

Very Low = <0.1, Low = .1-.3, Moderate = .4-.6, High = .7-.9

Irrigation Needs of Well-Established Landscape Species Determined from Field Research

• *Potentilla tabernaemontani*	0.5 - 0.75
• *Sedum acre*	0.25
• *Cerastium tomentosum*	0.25
• *Liquidambar styraciflua*	0.20
• *Quercus ilex*	0.20
• *Ficus microcarpa nitida*	0.20
• *Gazania hybrida*	0.25-0.50
• *Baccharis pilularis*	0.20

Achillea millefolium	Yarrow	L
Artemisia 'Powis Castle'	'Powis Castle'	VL
Coreopsis auriculata	Coreopsis	L
Erigeron karvinskianus	Mexican Daisy	L
Erysimum 'Bowles Mauve'	'Bowles Mauve'	L
Euphorbia cyparissias	Perennial Spurge	L
Helianthemum nummularium	Sunrose	L
Osteospermum fruiticosum	African Daisy	L
Phormium t. 'Atropurpureum'	Flax	L
Salvia greggii	Autumn Sage	L
Sisyrinchium californicum	Blue-eyed Grass	VL

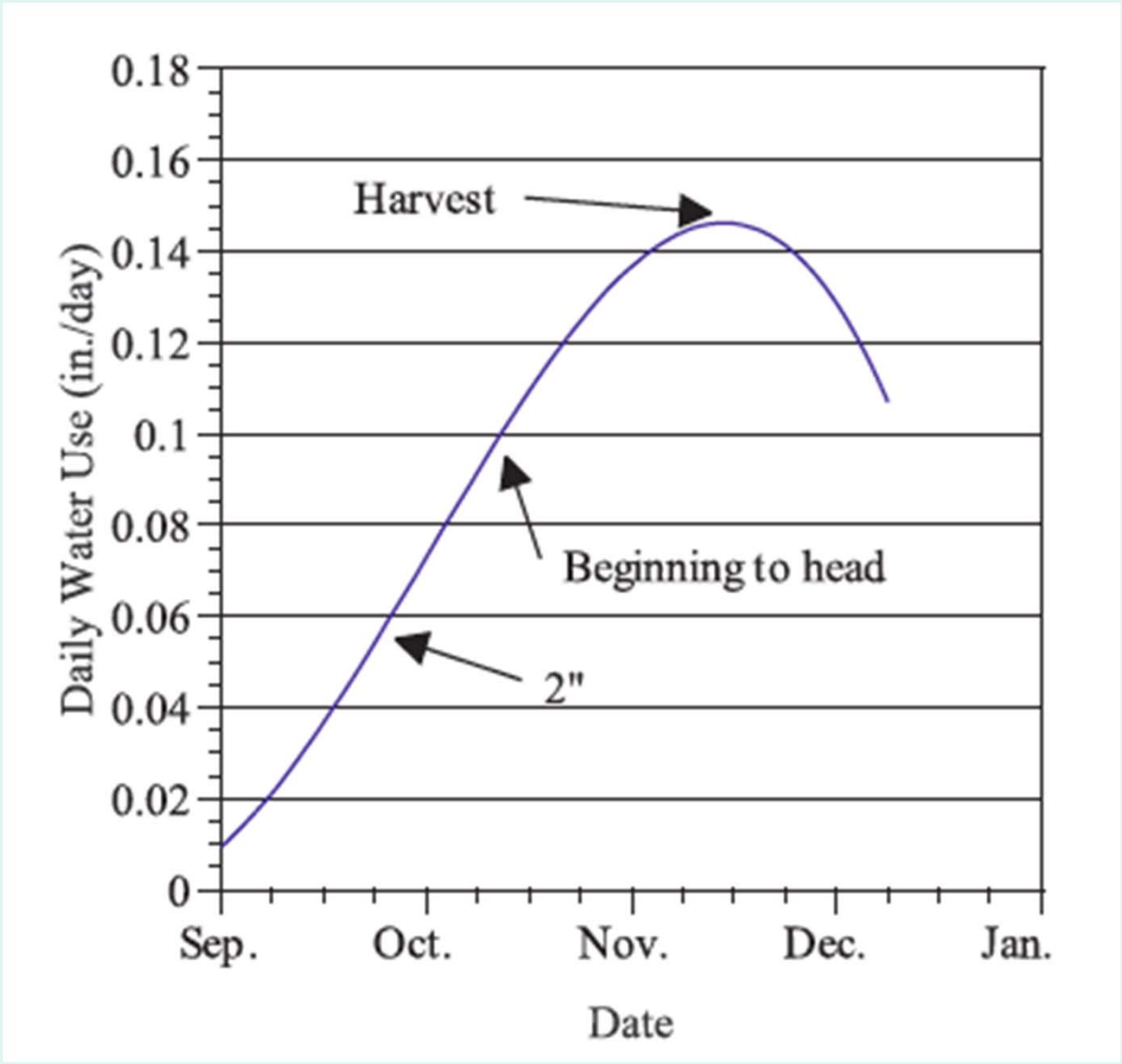
Very Low = <0.1, Low = .1-.3

Urban Tree Farm, Santa Rosa, CA

Table 3 Crop Coefficients for Forage, Vegetables and Berries

Crop	Kc_{ini}	Kc_{mid}	Kc_{end}
alfalfa	0.4	1.2	1.15
asparagus	0.3	0.95	0.3
beans, green	0.5	1.05	0.9
beets	0.5	1.05	0.95
blueberries	0.4	1.0	0.75
broccoli	0.7	1.05	0.95
cabbage	0.7	1.05	0.95
cabbage -local	0.7	1.05	0.95
carrots	0.7	1.05	0.95
cauliflower	0.7	1.05	0.95
cranberries	0.4	0.9	0.50
celery	0.7	1.05	0.95
cereal	0.3	1.15	0.25
corn	0.3	1.15	0.4
cucumber	0.6	1	0.75
green onions	0.7	1.05	0.95
lettuce	0.7	1	0.95

Crop	Kc_{ini}	Kc_{mid}	Kc_{end}
onions	0.7	1.05	0.95
pasture (grass)	0.4	1.0	0.85
peas	0.5	1.15	1.1
potato	0.5	1.15	0.75
pumpkin	0.5	1	0.8
radish	0.7	0.9	0.85
raspberries	0.4	1.2	0.75
small vegetables	0.70	1.05	0.95
spinach	0.7	1.05	0.95
strawberries	0.4	1.05	0.7
squash	0.5	0.95	0.75
sweet corn	0.3	1.15	0.4
sweet peppers	0.7	1.05	0.85
tomato	0.7	1.05	0.8
tubers	0.5	1.05	0.95
watermelon	0.4	1	0.75


0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Daily Water Use (in./day)
Harvest
Beginning to head
2"
Sep.
Oct.
Nov.
Dec.
Jan.
Date

$$ET_L = K_C \times ET_o$$

Landscape Evapotranspiration =
Landscape Coefficient (K_C) x Reference Evapotranspiration

Santa Rosa (daily rate)	**0.03**	**0.06**	**0.09**	**0.14**	**0.18**	**0.21**	**0.21**	**0.19**	**0.15**	**0.10**	**0.05**	**0.03**
(inches)	**Jan**	**Feb**	**M**	**Ap**	**May**	**J**	**Jly**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**

(Daily ET in inches. Xs 31 = Monthly Rate.)

2	1.24	1.68	3.10	3.90	4.65	5.10	4.96	4.65	3.90	2.79	1.80	1.24	39.0
3	1.86	2.24	3.72	4.80	5.27	5.70	5.58	5.27	4.20	3.41	2.40	1.86	46.3
4	1.86	2.24	3.41	4.50	5.27	5.70	5.89	5.58	4.50	3.41	2.40	1.86	46.6
5	0.93	1.68	2.79	4.20	5.58	6.30	6.51	5.89	4.50	3.10	1.50	0.93	43.9
6	1.86	2.24	3.41	4.80	5.58	6.30	6.51	6.20	4.80	3.72	2.40	1.86	49.7

Jan Feb M Apr May J Jly Aug Sept Oct Nov Dec Total

Daily Water Use (In Gallons per Day)

BASED ON VARIOUS EVAPOTRANSPIRATION RATES

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cabbage	0.7	1.05	0.95
cabbage -local	0.7	1.05	0.95
carrots	0.7	1.05	0.95
cauliflower	0.7	1.05	0.95
cranberries	0.4	0.9	0.50
celery	0.7	1.05	0.95
cereal	0.3	1.15	0.25
corn	0.3	1.15	0.4
cucumber	0.6	1	0.75
green onions	0.7	1.05	0.95
lettuce	0.7	1	0.95

Crop	Kc_{ini}	Kc_{mid}	Kc_{end}
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potato	0.5	1.15	0.75
pumpkin	0.5	1	0.8
radish	0.7	0.9	0.85
raspberries	0.4	1.2	0.75
small vegetables	0.70	1.05	0.95
spinach	0.7	1.05	0.95
strawberries	0.4	1.05	0.7
squash	0.5	0.95	0.75
sweet corn	0.3	1.15	0.4
sweet peppers	0.7	1.05	0.85
tomato	0.7	1.05	0.8
tubers	0.5	1.05	0.95
watermelon	0.4	1	0.75

$ET_L = K_C \times ET_o$ Asparagus = 0.95 X 0.21 = 0.19 inches/day

0.19 x 31 = 5.89 inches/month (June/July) in Santa Rosa, CA

4’ X 10’ = 40 sq. ft.

ET = 6”

10 sq.ft. = 1.25 gallons
1.25 gallons X 4 = 5 gallons

40 ft. = 40 emitters

5 gal. ÷ 40 - 1gph emitters
= .125 hours

60 minutes X .125 = 7.5 minutes

With 1/2gph emitters – **15 minutes/day**

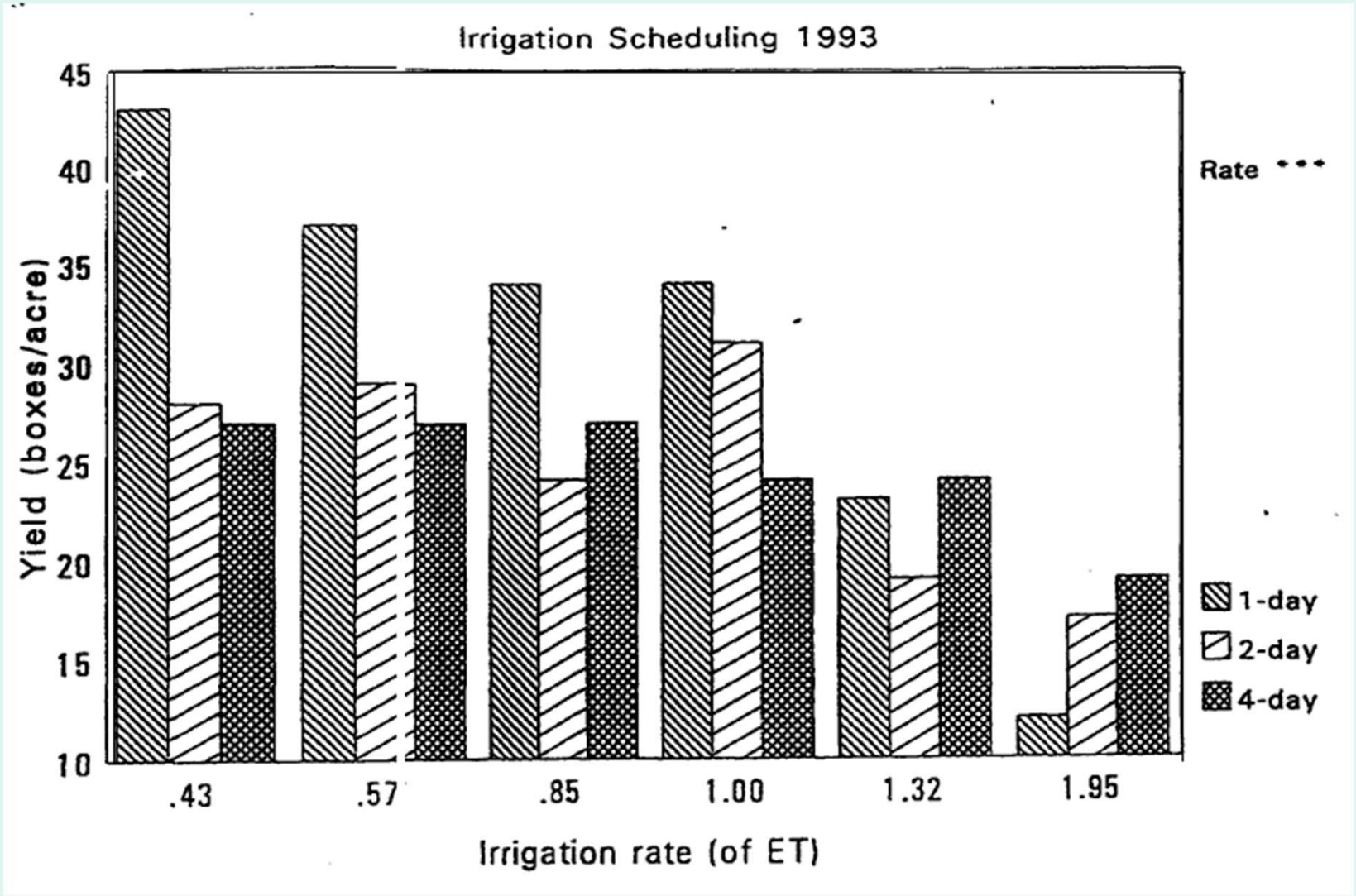
(once/week = 7 X 15 = 105 min. = 1.75 hrs.)

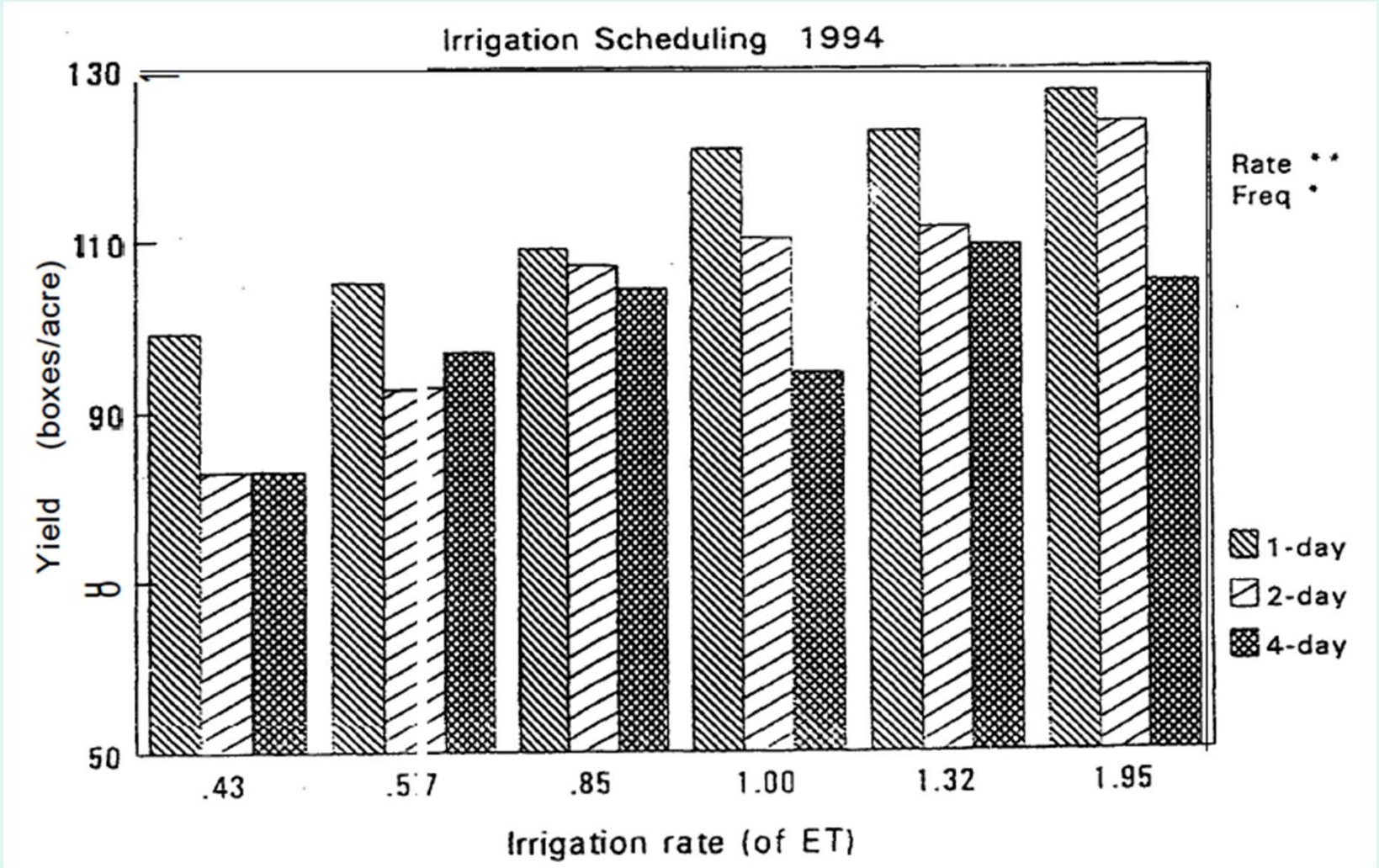
Table 1. Average relative yields by crop and drip irrigation frequency for irrigation frequencies of two irrigations per day, one irrigation per day, two irrigations per week, and one irrigation per week. Relative yields were calculated as the ratio of the average crop yield of a given irrigation frequency to the yield of the irrigation frequency with the maximum yield for that crop.

	Relative yield					
Irrigation frequency	Onion[z]	Fall lettuce[z]	Spring lettuce[z]	Pepper[z]	1st tomato crop[z]	2nd tomato crop[z]
2 irrigations/d	0.94 a	1.00 a	0.90 a	0.88 ab	0.87 b	0.95 a
1 irrigation/d	1.00 a	1.00 a	1.00 a	1.00 a	1.00 a	0.98 a
2 irrigations/week	0.91 a	0.91 a	0.91 a	0.91 a	0.90 ab	1.00 a
1 irrigation/week	0.77 b	0.77 a	0.91 a	0.86 b	0.88 ab	0.92 a
CV (%)	9.62	16.13	12.78	10.38	10.20	9.16

Table 2. Average relative yields of the pepper grades. Relative yields were calculated as the ratio of the average crop yield of a given irrigation frequency to the yield of the irrigation frequency with the maximum yield for that crop. Grade ratings are extra large [50 to 60 peppers/30-lb (13.6-kg) box], large (60 to 70 peppers/box), medium (70 to 85 peppers/box), and culls (>85 peppers/box).

Irrigation frequency	Relative yields of pepper grades			
	Extra large[z]	Large[z]	Medium[z]	Culls[z]
2 irrigations/d	0.66 a	0.88 a	0.95 ab	0.81 b
1 irrigation/d	1.00 a	1.00 a	1.00 a	0.85 ab
2 irrigations/week	0.79 a	0.94 a	0.92 ab	1.00 a
1 irrigation/week	0.80 a	0.94 a	0.83 b	0.88 ab
cv (%)	35.03	21.61	11.17	14.58


Irrigation Scheduling 1993
Yield (boxes/acre)
45
40
35
30
25
20
15
10
.43
.57
.85
1.00
1.32
1.95
Irrigation rate (of ET)
Rate ***
1-day
2-day
4-day


Irrigation Scheduling 1994
130
110
90
50
Yield (boxes/acre)
Rate **
Freq *
1-day
2-day
4-day
.43
.57
.85
1.00
1.32
1.95
Irrigation rate (of ET)

K_C = .7 early 1 mid .95 late

SUMMARY. The effect on crop yield of drip-irrigation frequencies of two irrigations per day (2/d), one irrigation per day (1/d), two irrigations per week (2/week), and one irrigation per week (1/week) was investigated for lettuce (Lactuca sativa), pepper (Capsicum annuum), and onion (Allium cepa) grown on sandy loam and processing tomato (Lycopersicon esculentum) grown on silt loam during experiments conducted during 1994 to 1997. All treatments of a particular crop received the same amount of irrigation water per week. Results showed that the 1/week frequency should be avoided for the shallow rooted crops in sandy soil. Irrigation frequency had little effect on yield of tomato, a relatively deep-rooted crop. These results suggest that drip irrigation frequencies of 1/d or 2/week are appropriate in medium to fine texture soils for the soil and climate of the project site. There was no yield benefit of multiple irrigations per day.

K_C =

.7 early

1.05 mid

.95 late

$K_C = .3$

K_C =

.5 early

.97 mid

.5 late

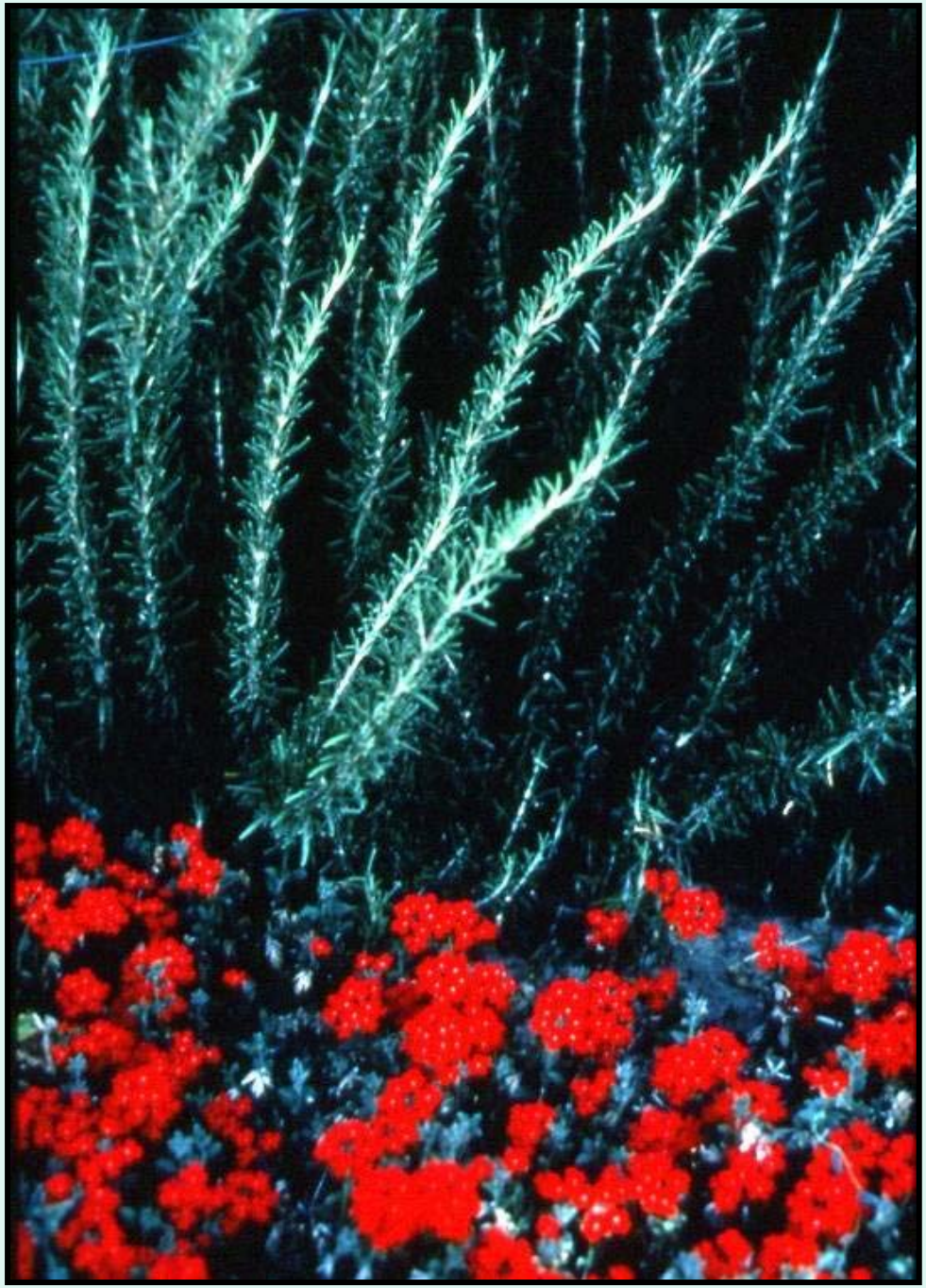
K_C =

.5 early

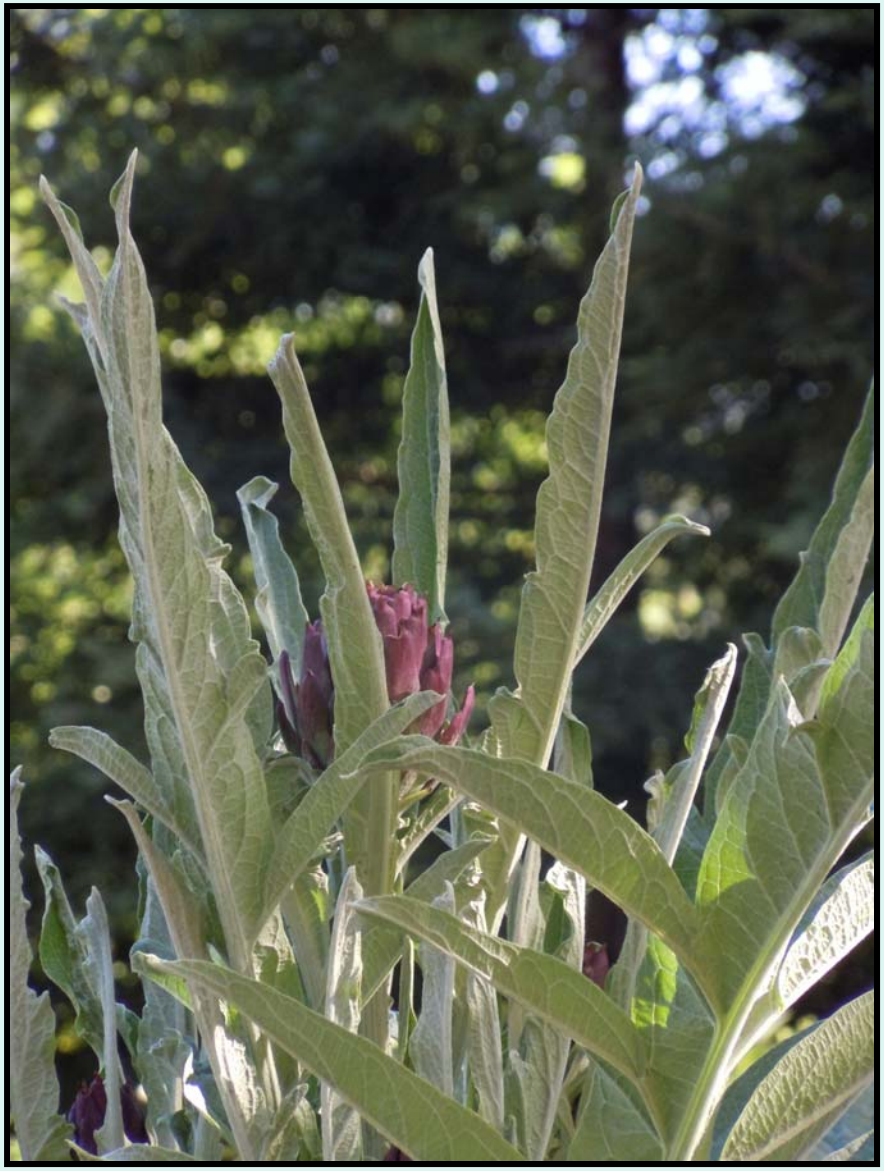
.97 mid

.5 late

$K_C = .2$



K_C = .5 early 1.05 mid .5 late



? .25

K_C = .7 early
1.05 mid
.95 late

K_C = .7 early

1.05 mid

.85 late

$K_C = .4 - .6$

K_C = Thyme .4 -.6, Lavender = .1-.3 (Foxglove .4 - .6)

Food	Gallons per Pound
Lettuce	23
Tomatoes	30
Carrots	33
Apples	49
Potatoes	60
Broccoli	65
Cantaloupe	80
Corn	168

Agave
Angel's Trumpet
Artemisia
Bracken Fern
California Myrtle
Carex
Clarkia
Comfrey
Coyote Bush
Cypress (columnar)
Daffodils
Echiums
Euphorbia
Euryops
Fescue
Forget-me-nots
Fortnight Lilly
Foxglove
Grevillia
Huckleberry
Jerusalem Sage
Junipers
Lavender Cotton, Santolina
Lavenders
Lion's Tail
Mints
Mullein
Naked Lady
Narcissus
Native Filbert
Native Iris
Ozomanthus
Pampas Grass, variegated, 'Sun Strip'
Rhododendron
Rosemary
Rue
Salvias, native & ornamental
Shasta Daisy
Thymes
Tulip
Yarrow

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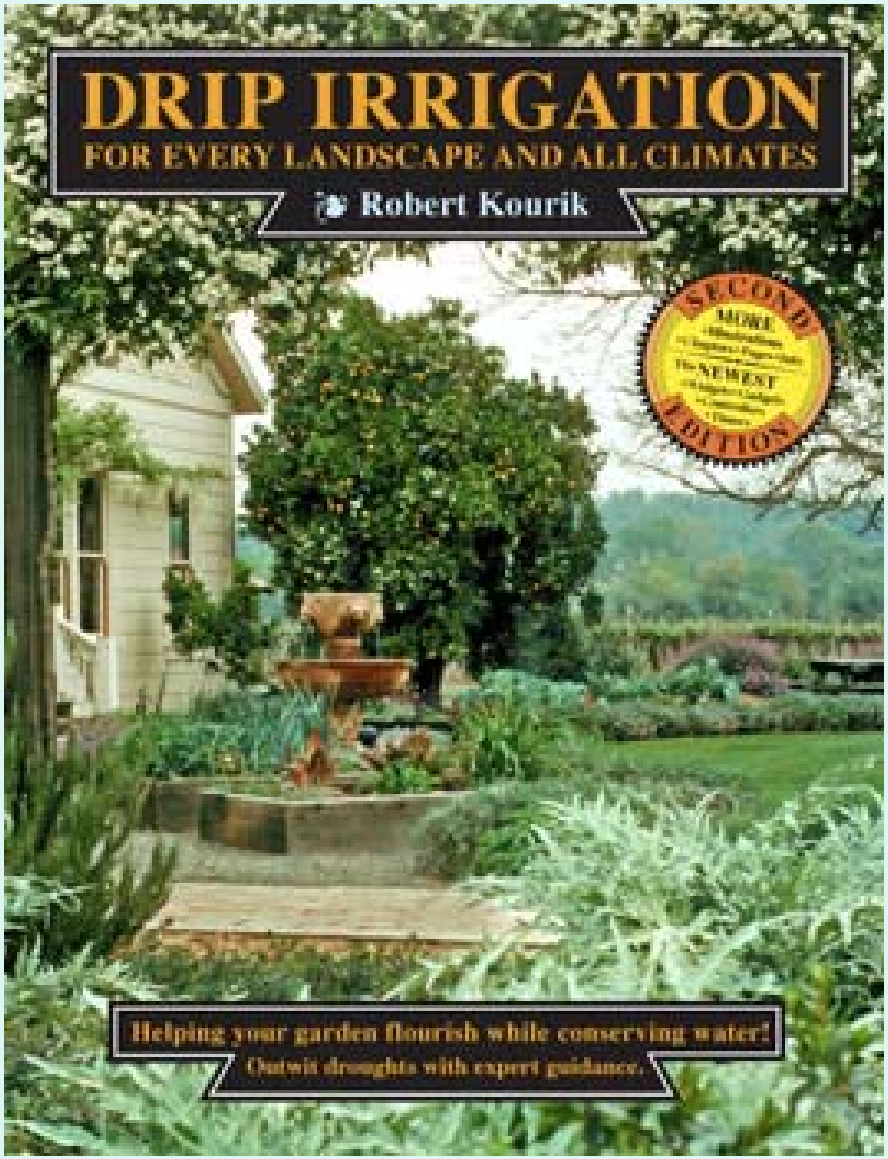
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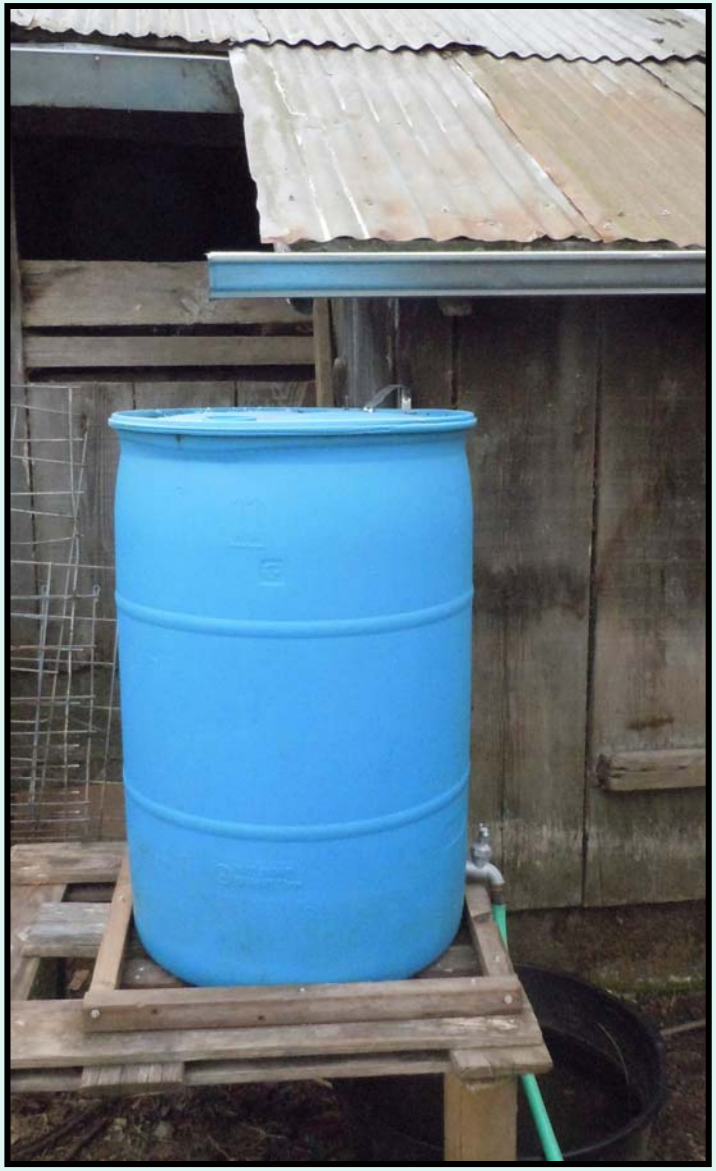
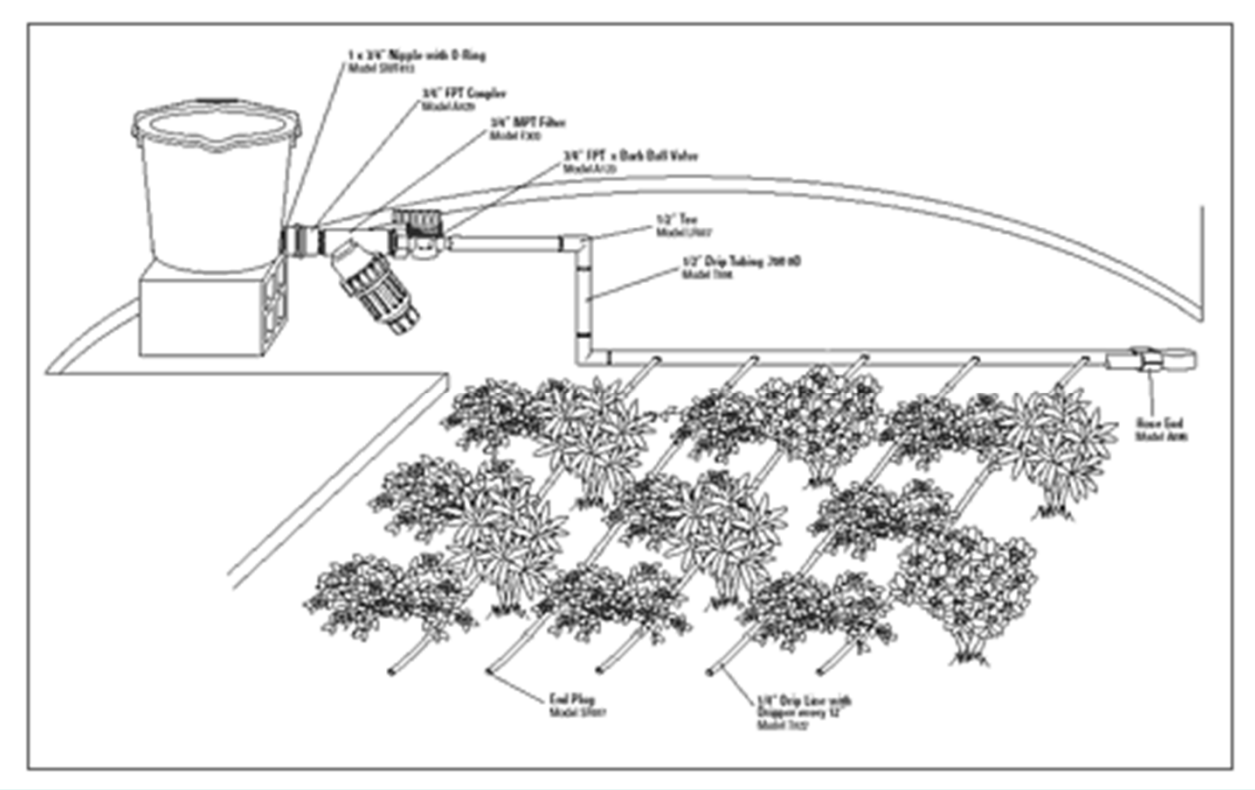
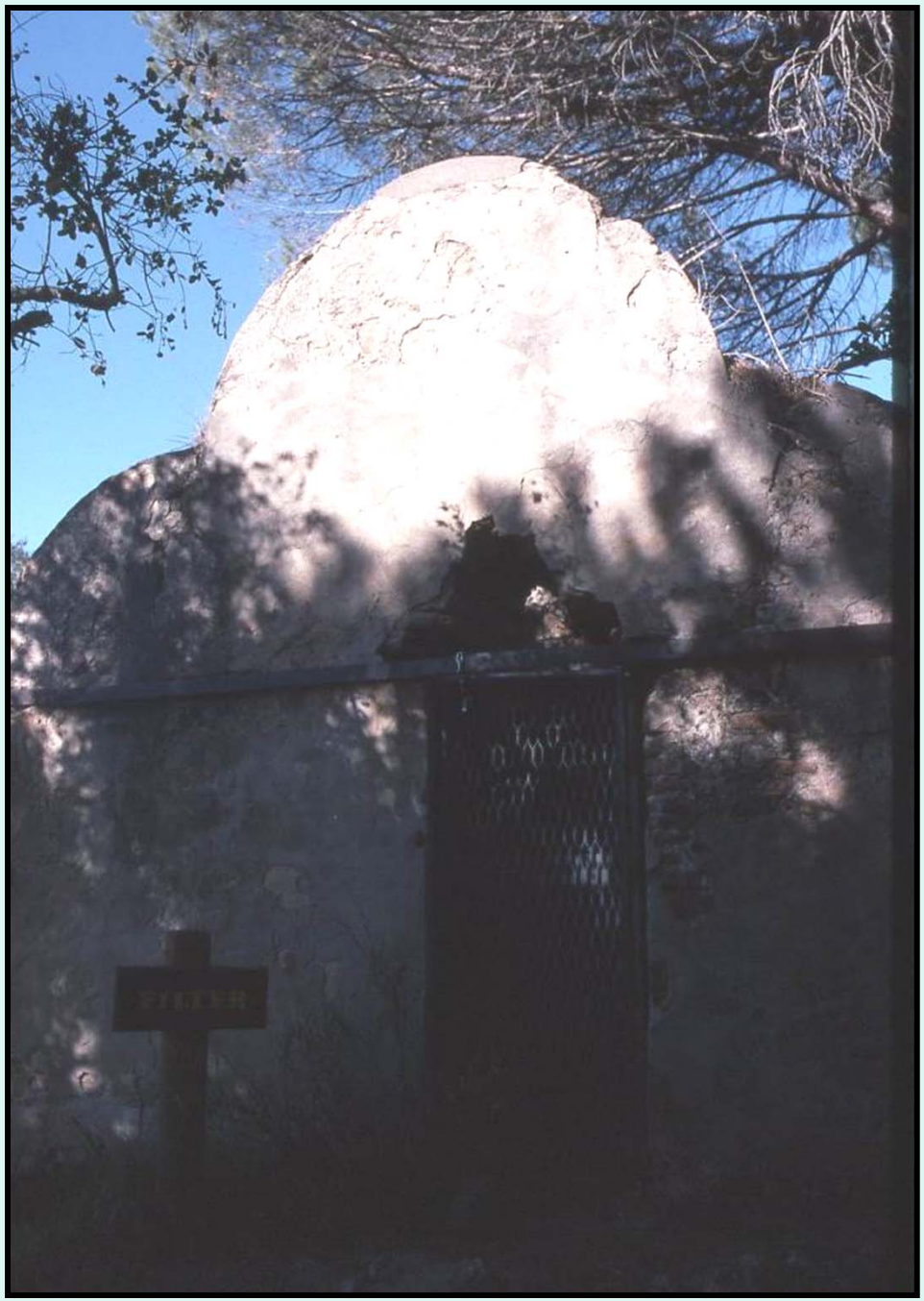
Robert Kourik
SECOND EDITION
MORE
NEWEST
Helping your garden flourish while conserving water?
Outwit droughts with expert guidance.

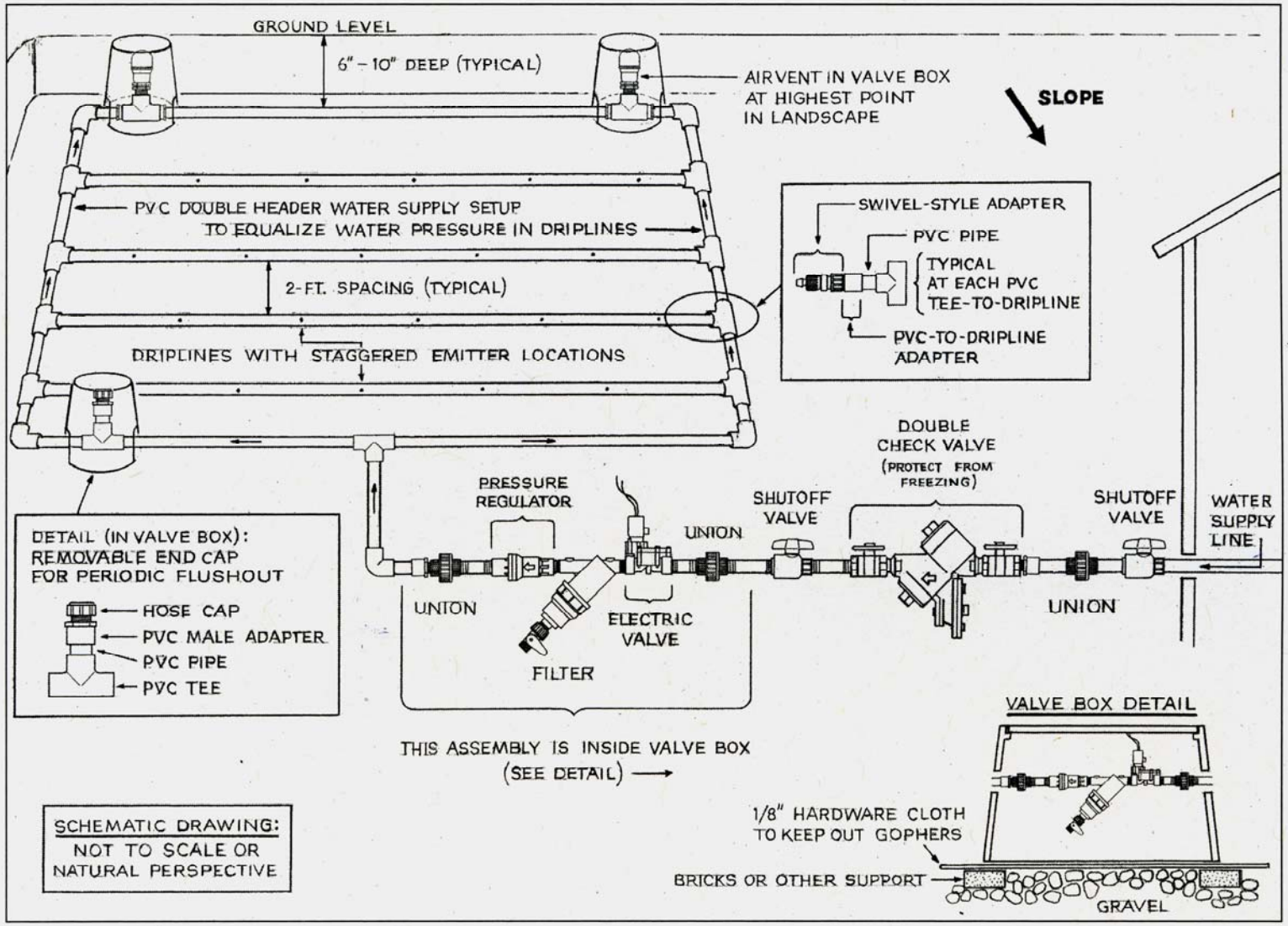
$~~24.95~~ Now $20



Barrel Size	Height above the drip system	1/4” run
50 gallon	8"	10'
50 gallon	12"	10'
50 gallon	16"	14'






GROUND LEVEL
6" – 10" DEEP (TYPICAL)
AIR VENT IN VALVE BOX AT HIGHEST POINT IN LANDSCAPE
SLOPE
PVC DOUBLE HEADER WATER SUPPLY SETUP TO EQUALIZE WATER PRESSURE IN DRIPLINES
2-FT. SPACING (TYPICAL)
DRIPLINES WITH STAGGERED EMITTER LOCATIONS
SWIVEL-STYLE ADAPTER
PVC PIPE
TYPICAL AT EACH PVC TEE-TO-DRIPLINE
PVC-TO-DRIPLINE ADAPTER
DETAIL (IN VALVE BOX): REMOVABLE END CAP FOR PERIODIC FLUSHOUT
HOSE CAP
PVC MALE ADAPTER
PVC PIPE
PVC TEE
PRESSURE REGULATOR
UNION
SHUTOFF VALVE
DOUBLE CHECK VALVE (PROTECT FROM FREEZING)
SHUTOFF VALVE
WATER SUPPLY LINE
UNION
ELECTRIC VALVE
UNION
FILTER
THIS ASSEMBLY IS INSIDE VALVE BOX (SEE DETAIL)
VALVE BOX DETAIL
1/8" HARDWARE CLOTH TO KEEP OUT GOPHERS
BRICKS OR OTHER SUPPORT
GRAVEL
SCHEMATIC DRAWING: NOT TO SCALE OR NATURAL PERSPECTIVE