



Rose Trials & Sustainability

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UC Landscape Plant Irrigation Trials (UCLPIT)

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- ▶ Close to 300 taxa evaluated since 2005
 - ▶ 48 rose cultivars
- ▶ 24 of each cultivar
- ▶ **NO FERTILIZERS,
PESTICIDES**





International Trends in Breeding (2017 ISHS Rose Conference)

- ❖ Disease resistance
- ❖ Rebloom
- ❖ Lower maintenance- fert. and pesticide-free
- ❖ FRAGRANCE
- ❖ Cold/heat tolerance

From Breeding to Market?

10-12 Year Process

- ▶ Cross pollination
 - ▶ Open field
 - ▶ Specific parental cross
- ▶ Seed collection and germination





Selection and Propagation

Breeder Eval. & Process

- ▶ Apply for patent
(official name)
- ▶ Screen for virus with
FPS at UC Davis
- ▶ Bulk up numbers
- ▶ Acquire a marketer (e.g.
Star Roses and Plants;
Proven Winners, etc.)



Outside Plant Trials- across the country/ the world

- ▶ Growers
- ▶ Universities
- ▶ Botanic Gardens
- ▶ Rose Societies & Gardens



Awards: UC Davis Blue Ribbon™

UC Davis Blue Ribbon™

Search for Plants

Search for plants...



An important and vigorous trial for determining the heat and drought tolerance of plants. Varieties are grown and monitored following the irrigation percentages in the Water Use Classification of Landscape Species IV (WUCOLS). Those that exhibit superior overall results on low water are awarded the Blue Ribbon™. Performed at UC Davis.

Plant Type

Shrubs

Evergreens

Roses

Floribunda

Groundcover

Landscape Shrub

Polyantha

Flower Color



Light Requirements



Release to Market

<https://www.starrosesandplants.com/awards/uc-davis-blue-ribbon/>

Rose Trials Past

- ▶ All-American Rose Selections
 - ▶ 1939-2013
 - ▶ 1st winner in 1940
 - ▶ Tested all over US
 - ▶ Had to win in all regions
 - ▶ **Only 1 winner/year**



Rose Trials Present- Sample



ADR- German New Rose Trials

American Rose Trials for Sustainability

America Garden Rose Selections

International Rose Trials

COMMON GOAL:
Beautiful, carefree
roses





International Rose Trials- WFRS

- ▶ First winners 2009
- ▶ 25 sites in 17 countries (2-3 in U.S.A.)
- ▶ Utilizes permanent judging panel (≥ 5)
- ▶ Only 1 rose/class named winner

IRT U.S.A. Sites

- ▶ Rose Hills; Whittier, CA
- ▶ American Rose Center; Shreveport, LA
- ▶ Biltmore Garden; Asheville, N.C.



What's wrong with this picture?

Recommendations
are highly regional

ADR

(Allgemeine Deutsche
Rosenneuheitenprüfung)
**German New Variety Rose
Trials**

- ▶ Evaluated 2 years
 - ▶ 5 ratings per year
 - ▶ Permanent judging panel
- ▶ No spray trial
- ▶ Foliage (35%), flowers (40%), overall impression (25%)
- ▶ 12 test gardens in Germany



AARS Replacement Trials

American Garden Rose Selections	American Rose Trials for Sustainability
<ul style="list-style-type: none">▶ Began 2013▶ 1ST Prize 2015▶ INDUSTRY LED▶ 6 regions	<ul style="list-style-type: none">▶ Began 2014▶ 1ST Prize 2017▶ ACADEMIA LED▶ 9 regions▶ No fertilizers▶ Prescribed irrigation

Dispute & Competition here!

Characteristics Rating Comparison

Criteria	AGRS	ARTS
	%	%
Foliage	35	45
Flowers	40	42.5
Form/ Garden Impression	25	12.5




American Garden Rose Selections

- ▶ 11(12) test sites
- ▶ 3-6 per cultivar planted together
- ▶ 2 years- 3 evals/year
- ▶ No limit to winners
- ▶ Based on ADR criteria

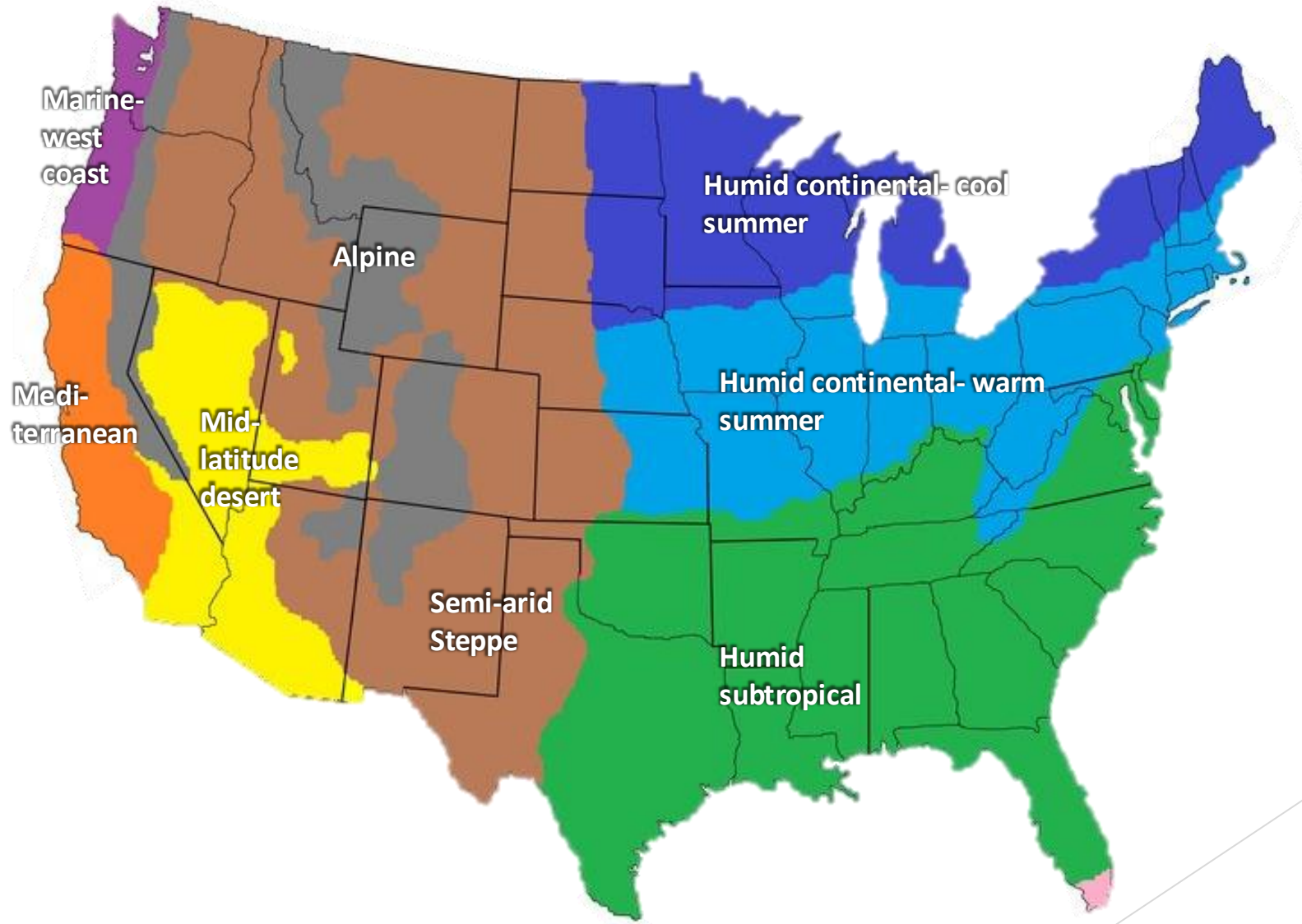


A.R.T.S.

American Rose Trials for Sustainability

- ▶ 18 (23) test sites
 - ▶ Soil prep encouraged
 - ▶ adjust pH to 6.5-7
 - ▶ OM to 5% by addition of compost
 - ▶ Drip irrigation
 - ▶ 1-inch per week May/June-Aug/Sept
 - ▶ Mulch with organic material
- 

Köppen Climate Zones



Difference
#1
from
AGRS:
9
regions

Site layout: Scientific experimental design

Difference
#2
from
AGRS

Row 1		Row 2
2018-15	BLOCK 1	2018-10
2018-14		2018-13
2018-01		2018-20
2018-04		2018-19
2018-16		2018-18
2018-11		2018-09
2018-05		2018-12
2018-07		2018-06
2018-17		2018-02
2018-03		2018-08
2018-01	BLOCK 2	2018-15
2018-04		2018-06
2018-14		2018-17
2018-19		2018-13
2018-18		2018-02
2018-05		2018-09
2018-07		2018-16
2018-08		2018-11
2018-03		2018-20
2018-12		2018-10
2018-02	BLOCK 3	2018-16
2018-08		2018-10
2018-19		2018-15
2018-13		2018-04
2018-07		2018-14
2018-20		2018-09
2018-05		2018-03
2018-01		2018-06
2018-12		2018-11
2018-17		2018-18

- ▶ 6 ft. between plants
- ▶ 7 ft. between rows
- ▶ 3 plants of each cultivar
- ▶ 3 randomized blocks
- ▶ 1 plant of each cultivar in each block

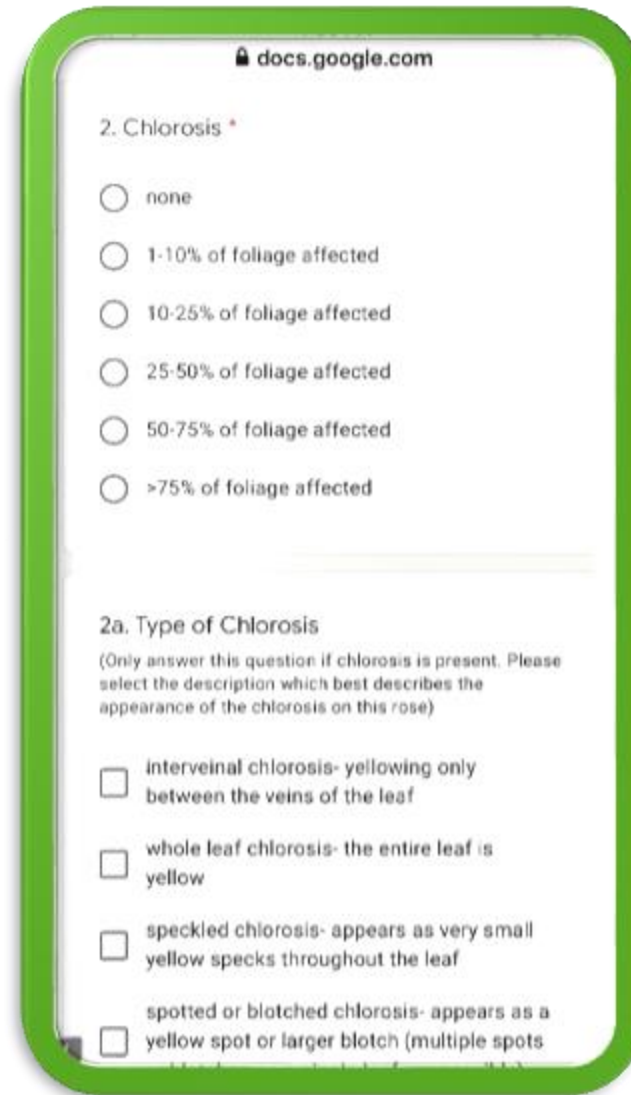
A.R.T.S. Distinctions

- ▶ Monthly ratings entire growing season (6-8)
- ▶ No limit to winners
- ▶ Regional & National prizes



Online data entry

- ▶ Each category divided into levels
- ▶ Total pts. sum of ind. ratings
- ▶ Some categories for descriptive purposes



docs.google.com

2. Chlorosis *

none

1-10% of foliage affected

10-25% of foliage affected

25-50% of foliage affected

50-75% of foliage affected

>75% of foliage affected

2a. Type of Chlorosis

(Only answer this question if chlorosis is present. Please select the description which best describes the appearance of the chlorosis on this rose)

interveinal chlorosis- yellowing only between the veins of the leaf

whole leaf chlorosis- the entire leaf is yellow

speckled chlorosis- appears as very small yellow specks throughout the leaf

spotted or blotched chlorosis- appears as a yellow spot or larger blotch (multiple spots)

Very specific guidelines mean consistency

SELF-CLEANING

No spent petals or calyces observed	0.5
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Many calyces without petals remain, undergoing transformation into hips- calyx tissue retains color and is obviously alive and healthy	0.5
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A few petals remain on some of the calyces (newly forming hips)- These petals appear as brown papery appendages	0.25
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A substantial number (more than 25%) of petals remain on the calyces	0.125
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Many calyces without petals remain on the plant as dark dried-up appendages, giving the plant a “messy” appearance	0
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Spent flowers remain on the plant as unsightly brown masses- Some of these “dead mummies” need only a slight touch and they fall off on their own. Others would normally require dead heading with pruners. Although certainly the first case is more desirable, the score in either case is the same. Comments on this discrepancy are welcome.

	0
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Bottom Line

Pluses and Minuses to ALL trials

Sustainability

Lessons from UCLPIT & A.R.T.S.



Soil prep

Mulch

Fertilization

Companion
planting

Irrigation
optimization

Soil prep

- ▶ TEST soil for pH, nutrients, and OM% (Organic Matter)
- ▶ Adjust pH to 6.5 - 7
 - ▶ Down with sulfur
 - ▶ Up with lime





Soil prep

- ▶ OM @ 5% or more is best
 - ▶ Add at least 3” of compost tilled to a depth of 1’
- ▶ NO PHOSPHORUS
<https://rose.org/the-rose-phosphate-mycorrhizae-connection/>



Benefits of Mulch

- ▶ Conserves moisture
- ▶ Improves water infiltration
- ▶ Moderates soil temps
 - ▶ Improves root health
 - ▶ Encourages beneficial microbes
- ▶ Slowly adds OM to soil

Fertilization

- ▶ Opt for organic and slow-release regimes
 - ▶ Conserves soil life
 - ▶ Produces less tender, succulent foliage > fewer pest problems



Eliminate fungicides & insecticides

Broad-range products kill beneficial fungi and pollinators & predatory insects





Companion Planting: Provide shelter/ resources for beneficial insects

- ▶ Grasses
- ▶ Bulbine & others
with tightly
packed leaves



Irrigation: How much water do roses need?

It depends!

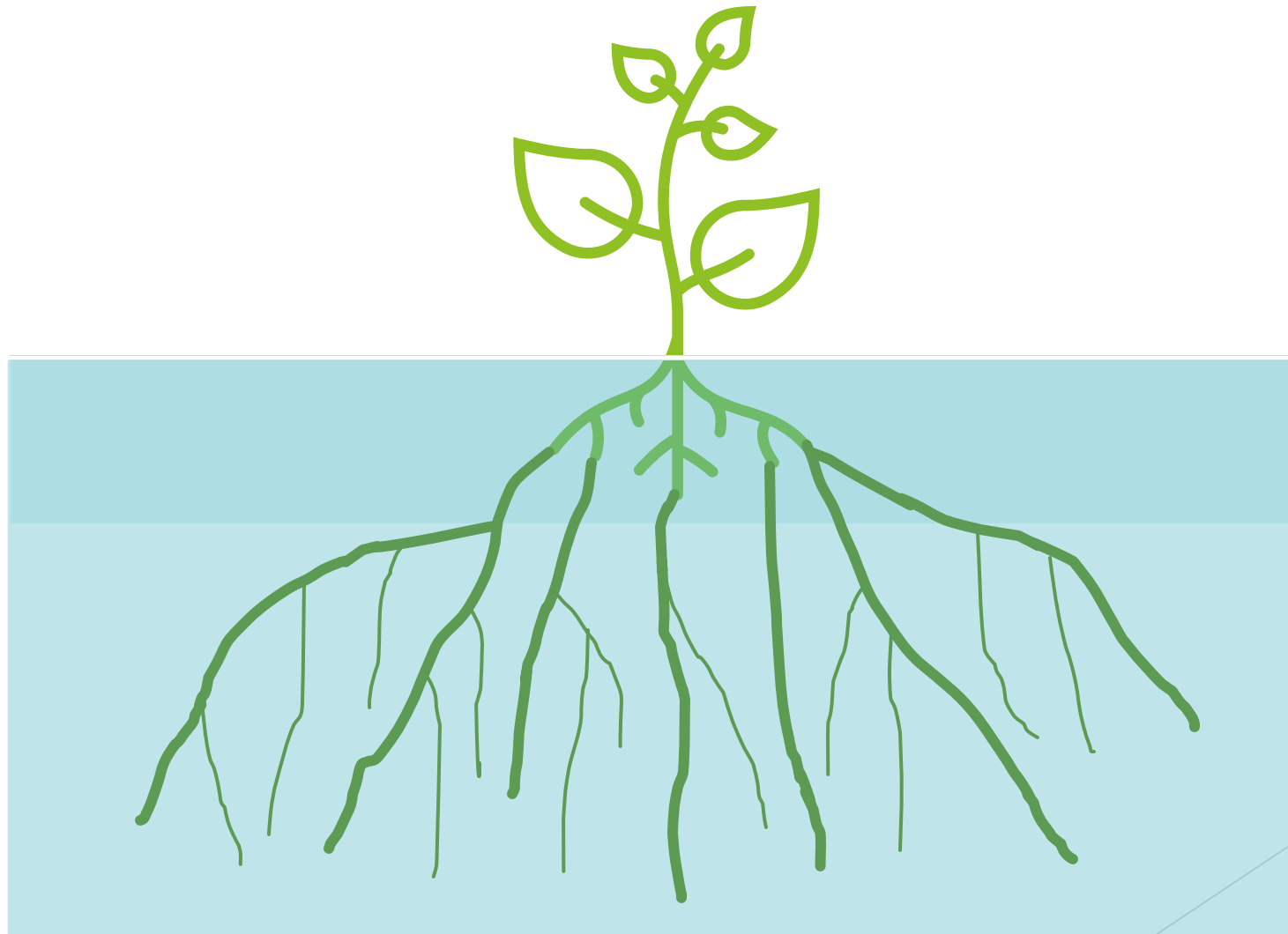
Main factors affecting water need

- ▶ Temperature
- ▶ Wind speed
- ▶ Relative humidity
- ▶ Solar radiation
 - ▶ Length
 - ▶ Intensity
- ▶ Rainfall

How roots grow



Deeper roots = bigger bucket



Problems with frequent, shallow watering

- ▶ Saturation of surface soil
 - ▶ Decreased oxygen
 - ▶ Increased bad fungus
 - ▶ Decreased good microbes
- ▶ Deeper root DIE-OFF





Too frequent
watering in hot
weather also
produces

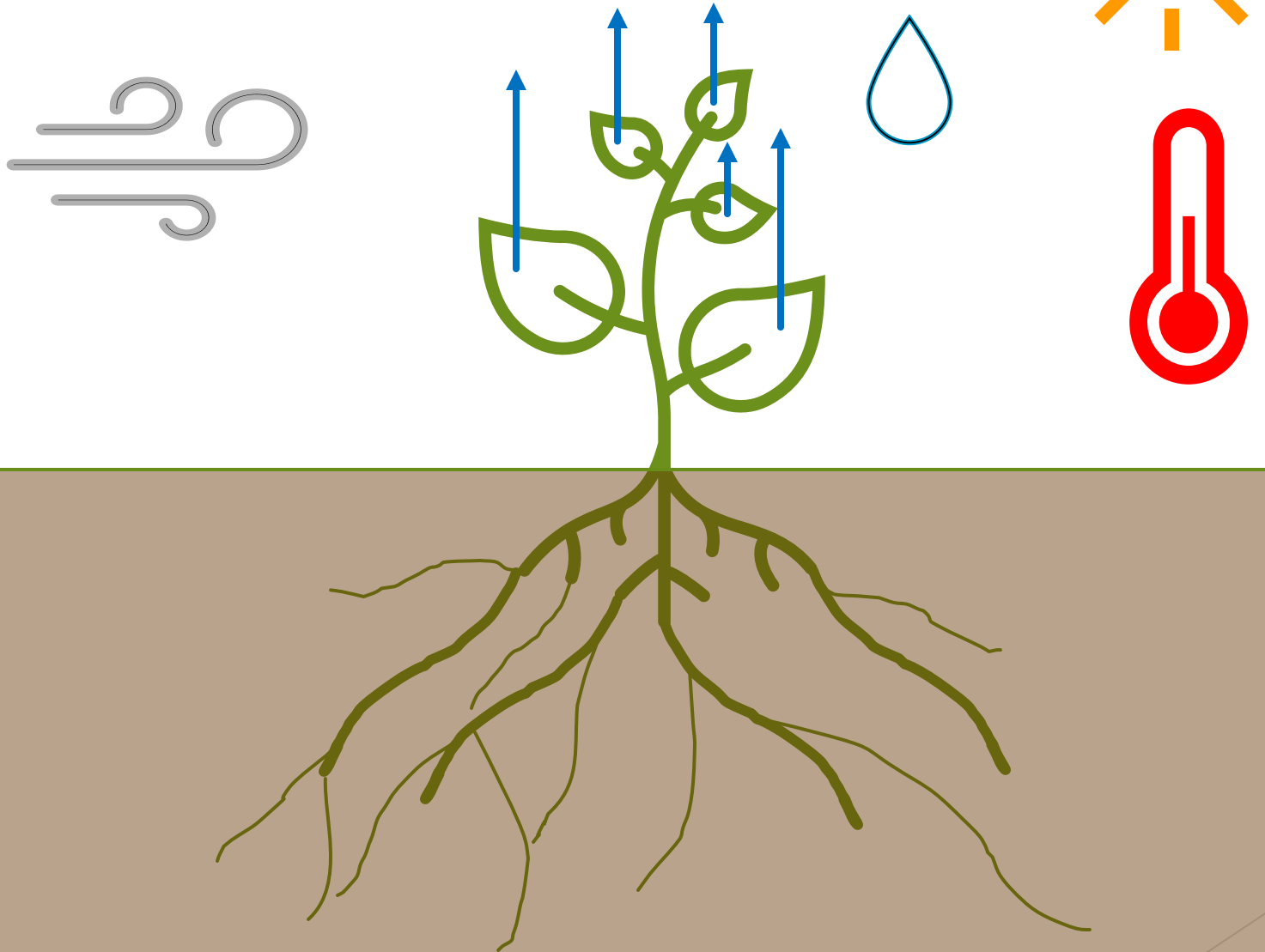
Pest and Disease-
susceptible foliage
flushes



Evapotranspiration (ET)

the loss of water to the atmosphere by evaporation from soil and transpiration from plants; measured in inches.

Plants take up water passively



As long as

- Stomata are open.
- Water is available in soil.
- High temps cause some plants to close stomata to conserve water.
- As available water is used up, it becomes harder for plant to take up water.



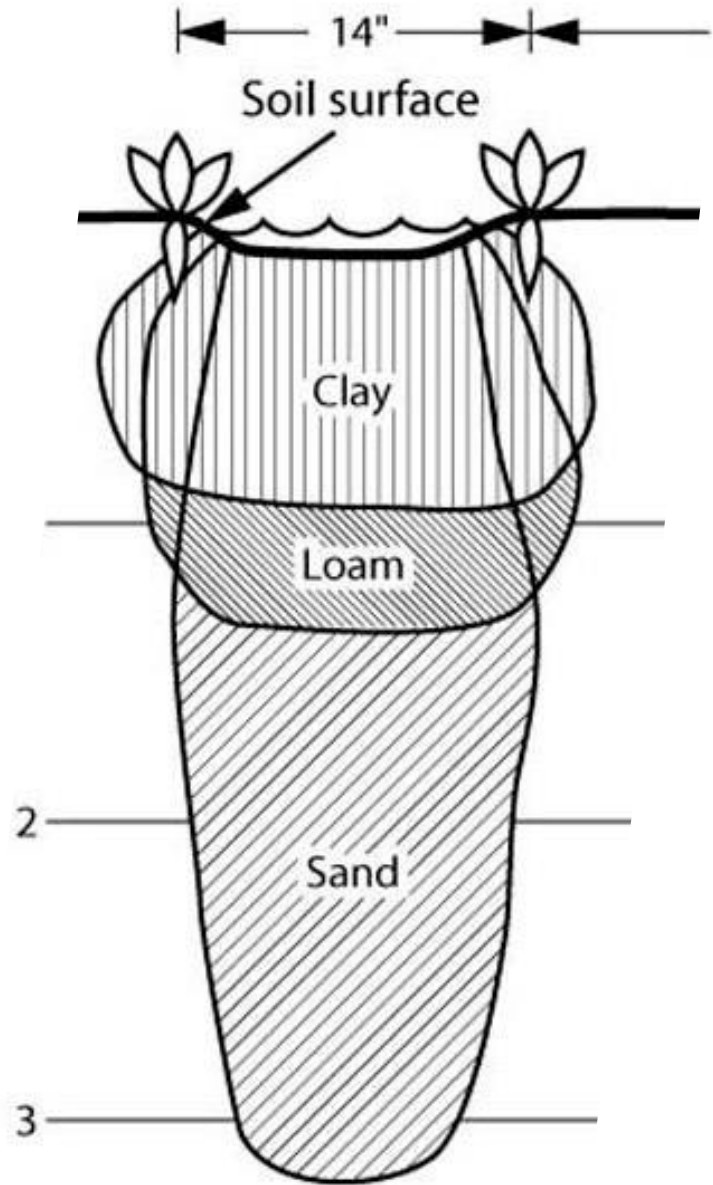
Available Water (AW)

- ▶ **Varies by soil type and OM content**
- ▶ **The amount of water present in the soil *that plant roots can take up.***
- ▶ **Some held tightly to soil particles.**
- ▶ **Some drains below root zone**

AW depends on soil type

Soil Texture	Total water (in/ft)	Available water (in/ft)
Sand	0.6-1.8	0.4-1.0
Sandy loam	1.8-2.7	0.9-1.3
Loam	2.7-4.0	1.3-2.0
Silt loam	4.0-4.5	2.0-2.1
Clay loam	4.2-4.8	1.8-2.1
Clay	4.5-4.8	1.8-1.9

- ▶ Sandy loam has *less* total available water than loam
- ▶ Loam has *less* total av. water than clay loam
- ▶ Clay loam or silt loam have the most AW



Water Infiltration Rate

- ▶ Varies by soil type
- ▶ Affected by
 - ▶ Organic matter content
 - ▶ Compaction layers
 - ▶ Mulch layer
 - ▶ Slopes
 - ▶ Hardpan

Plant Water Use Categories

(Based on Reference Evapotranspiration-ET_o)



LOW

20%

MED

50%

HIGH

80%

Grass is the reference plant (100%), but it will perform well on 80% of its own maximum capacity for uptake.

Average GRASS water use in./per week

Historical ETo for Zones 13 & 14 in inches

ZONE	APRIL	MAY	JUN	JULY	AUG	SEPT	OCT
13	1.2	1.6	2	2.3	1.9	1.4	.9
14	1.3	1.7	2	2.2	2	1.4	1

Eto zones are not the same as USDA climate zones. They are defined by the California Dept. of Water Resources

How much water
do roses need?

1" per week in
midsummer!
(or less)



Reduce plant stress: water when 50% AW is used

Soil Texture	AW(in /ft)	Water when ET is	Frequency in days (95F+)
Sandy loam	1	0.5	2-3
Loam	1.5	0.75	3-4
Silt loam	2.0	1	5-7
Clay loam	2.0	1	5-7

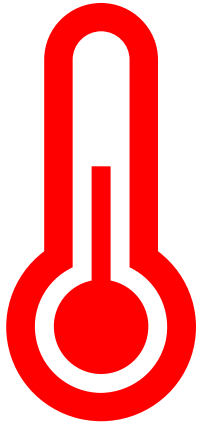


Research-proven Irrigation Methods



- ▶ Establish root system 18-24” in first year with regular irrigation
- ▶ DEEP, infrequent irrigation in subsequent years
 - ▶ Even distribution to root zone
- ▶ Pay attention to weather
 - ▶ Don't OVERreact

What about heat waves?



- ▶ Light spraying
 - ▶ Increases relative humidity
 - ▶ Reduces heat stress
- ▶ Keep mulch thick
- ▶ Check soil moisture down deep

Many plants use LESS water when temps are high!



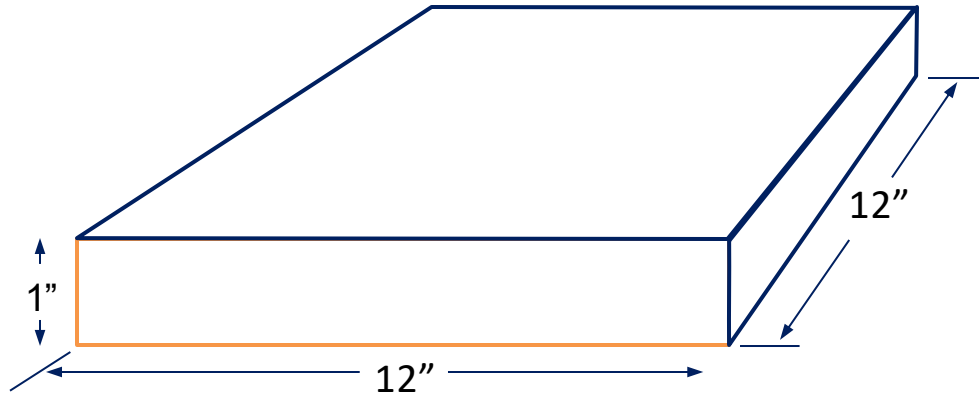
Helpful Hints

Gradually wean shallow-rooted shrubs

Adjust for site conditions: slopes, wind, etc.

How many gallons/plant?

NOTE: 1 in. of water in 1 square foot is 0.623 gallons



This equals

- **8.4 G** in a 3 ft. square (9ft^2) 18" deep
($0.623 \times 9 \times 1.5$)
- **11 G** in a 3 ft. square (9ft^2) 2 ft. deep
($0.623 \times 9 \times 2$)

QUESTIONS?

