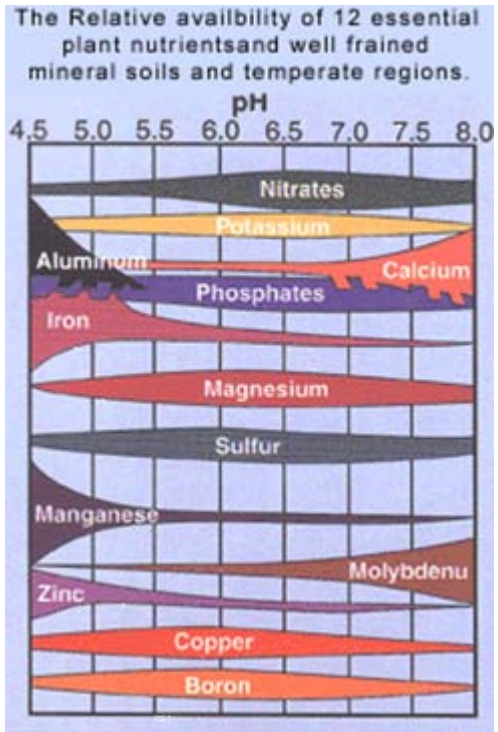
Acidifying blueberry soil

Soil pH controls the availability of iron, zinc and manganese.

Blueberries require a pH of 5 and most CA soils are 7 or higher



The amount of acid required to lower soil pH is determined by:

+ the soil's pH
+ the Cation Exchange Capacity (CEC)
+ the free lime or residual carbonates

The CEC is basically a reflection of the soil texture, the more clay, the higher the CEC and the more acid is required to lower the pH

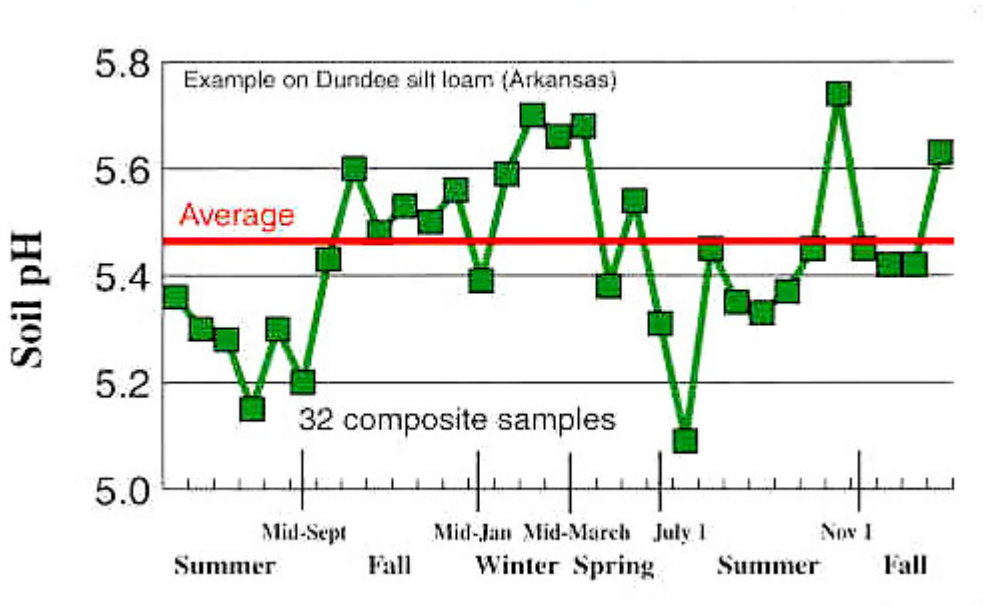
Cation Exchange Capacity

Soil Texture	CEC Range (meq/100 g soil)
Organic soils	> 50
Fine (clays)	25-50
Medium (silts)	8-30
Coarse (sands)	5-15

Measuring soil pH

Method	**soil 1**	**soil 2**	**soil 3**
Lab average	7.9	6.3	5.6
Hand-held	7.7	6.3	5.5
Color kit	8.0	6.5	5.5
pH probe	6.0	6.0	6.0

Soil pH changes seasonally, lowest when soils are warm and wet. As much as 1 pH unit difference in sandy soils



Free lime in California agricultural soils ranges from 0 – 5%. This buffers, or controls, the pH. Until free lime is dissolved, the soil pH will not drop.

Cubic foot of soil = 100#

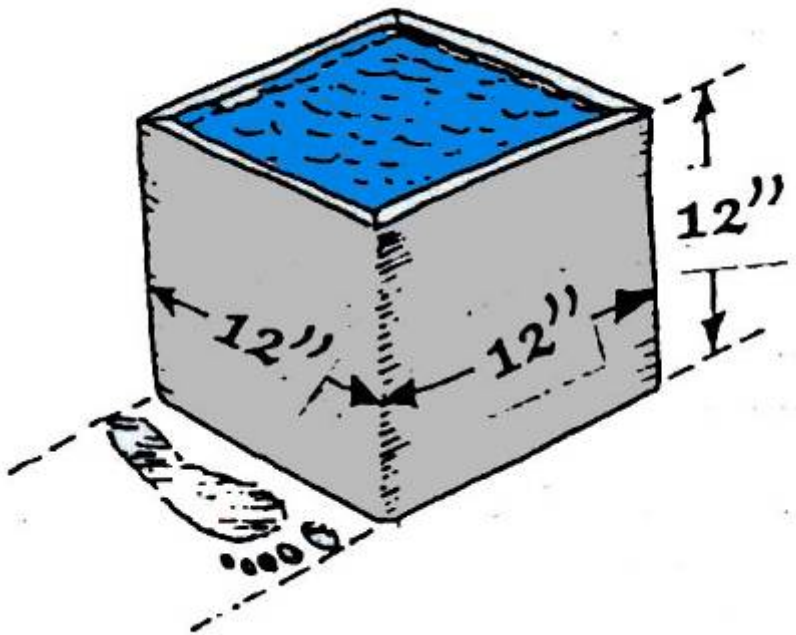
1 acre-6” = 2,178,000#

1% $CaCO_3$ = 21,780#

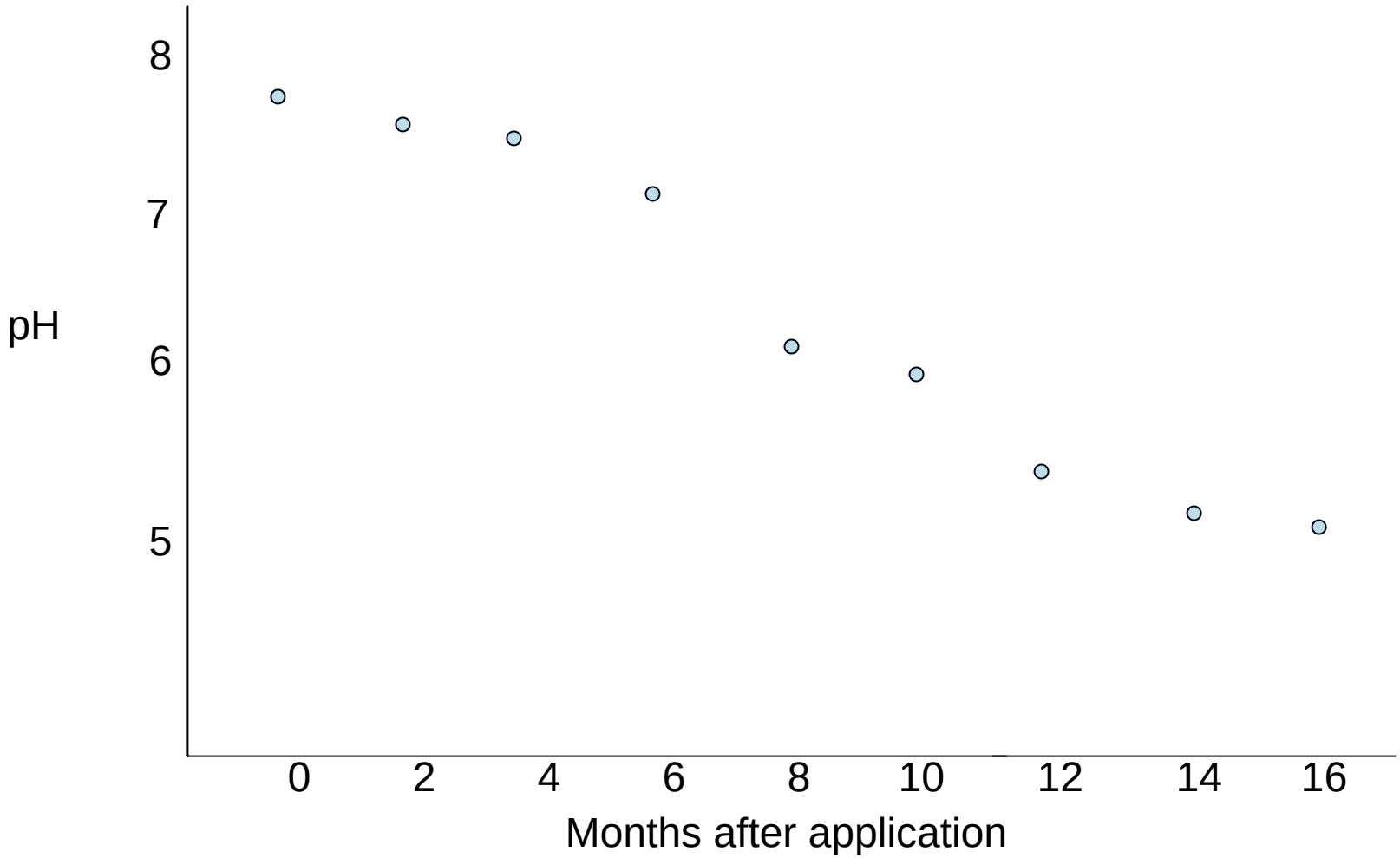
Equivalent weight of H_2SO_4 to neutralize $CaCO_3$

or 1/3 elemental sulfur

So need 7,260# S to neutralize the lime



pH drop w/ sulfur application (4 T/A) to clay-loam (pH 7.8), 1% lime



The world demand for S has driven the price of a ton up to $600 – 800 for the clay/sulfur pellets which break up when wetted.

Instead of broadcasting prior to berm-building, it might be cheaper and just as effective if the berms only are treated when they are built

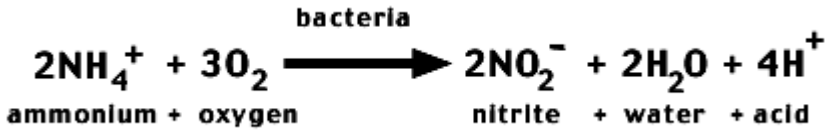
Organic matter has an effect on pH

OM → protein → amino acids → NH_4 → NO_3 + 4H

But are some sources better than others for acidification?

Amendment	Days after incorporation of amendments			
	0	14	30	60
Coffee	7.0 c	6.8 b	6.8 b	6.2 b
Lemon	4.8 d	6.5 b	6.2 c	6.2 b
None	7.8 a	7.8 a	7.8 a	7.8 a
Oak	7.6 a	7.7 a	7.7 a	7.2 a
Peat	7.0 c	6.7 b	6.7 bc	6.6 b
Pine	7.3 b	7.5 a	7.5 a	7.2 a
Yardwaste	7.7 a	7.5 a	7.5 a	7.3 a

Ammonium containing fertilizers will gradually lower pH, especially in sandy soils



Foliar sprays of iron, can help but need to be applied frequently and are expensive in the long run

Soil drenches of iron are possible, but are expensive and entail yearly applications

If water pH exceeds 7.5, it should be acidified

Before investing $10,000 an acre:

+ measure soil pH
+ allow sufficient time, possibly a year, for acidification
+ monitor soil pH several times before planting

Presented by
Ben Faber, farm advisor
University of California
Cooperative Extension Ventura County

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