Soil Structure

The Importance of soil composition and moisture

Illustrative Soil Horizons

- Organic, O Horizon
- Surface, A Horizon
- Subsoil, B Horizon
- Substratum, C Horizon
- Bedrock or Parent Material, R Horizon

The depth of each horizon varies significantly between soil types and within a soil type

Horizons

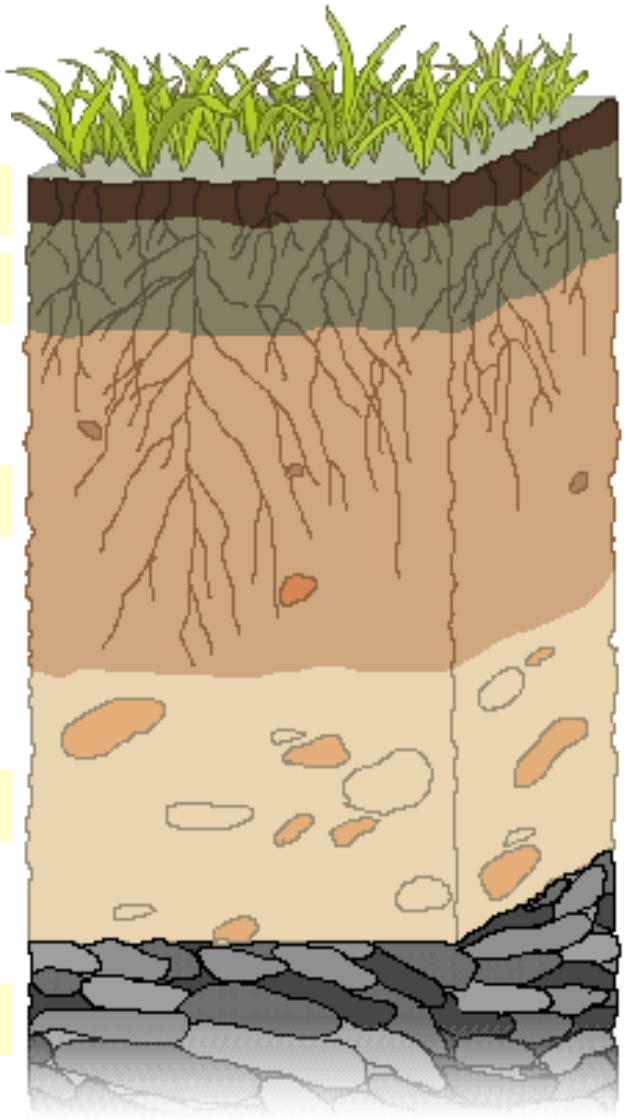
O (Organic) 0-2 in.

A (Surface) 2-10 in.

B (Subsoil) 10-36 in.

C (Substratum) 36-60 in.

R (Bedrock) 60+ in.

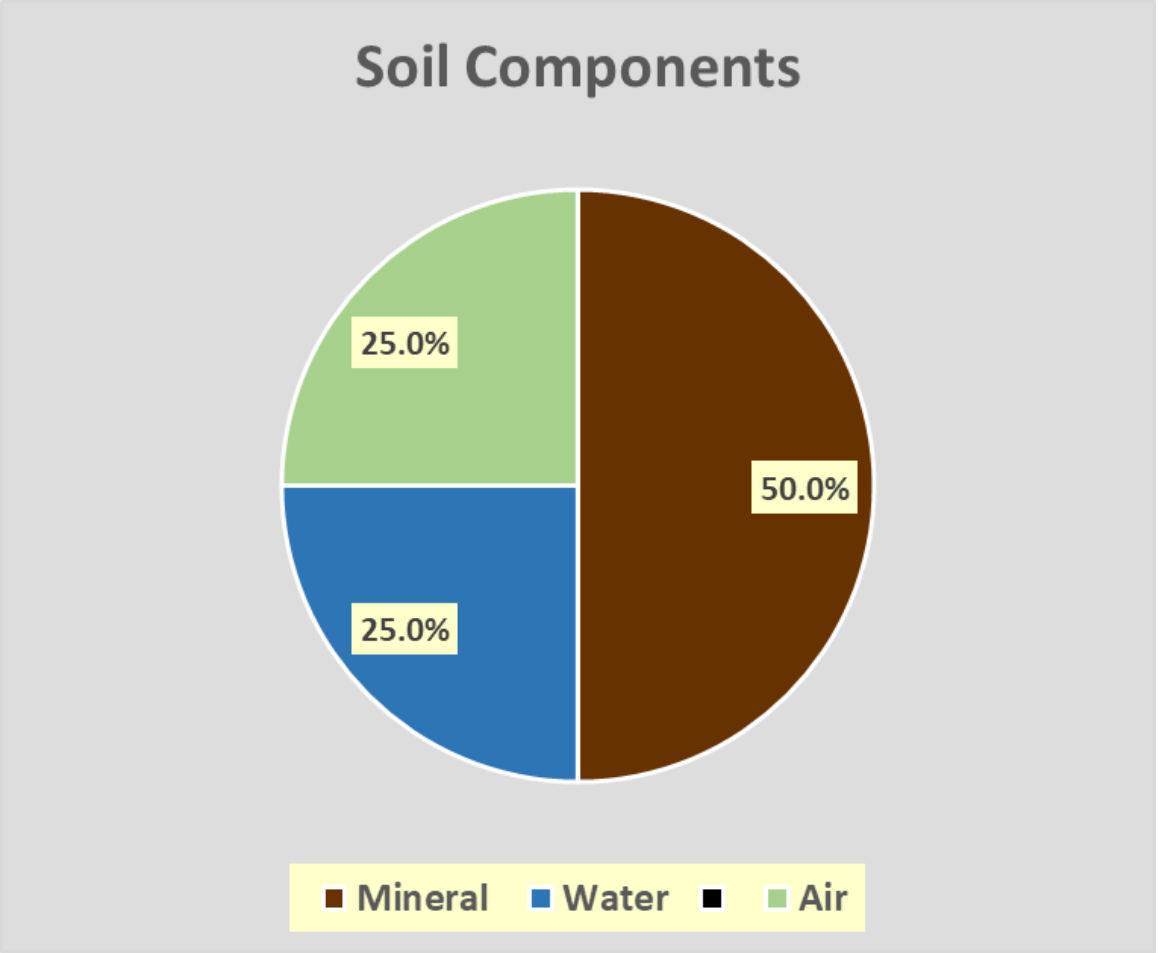


- Adapted from: https://en.wikipedia.org/wiki/Soil_horizon - Feb2021, by Larry D King

The Living Soil

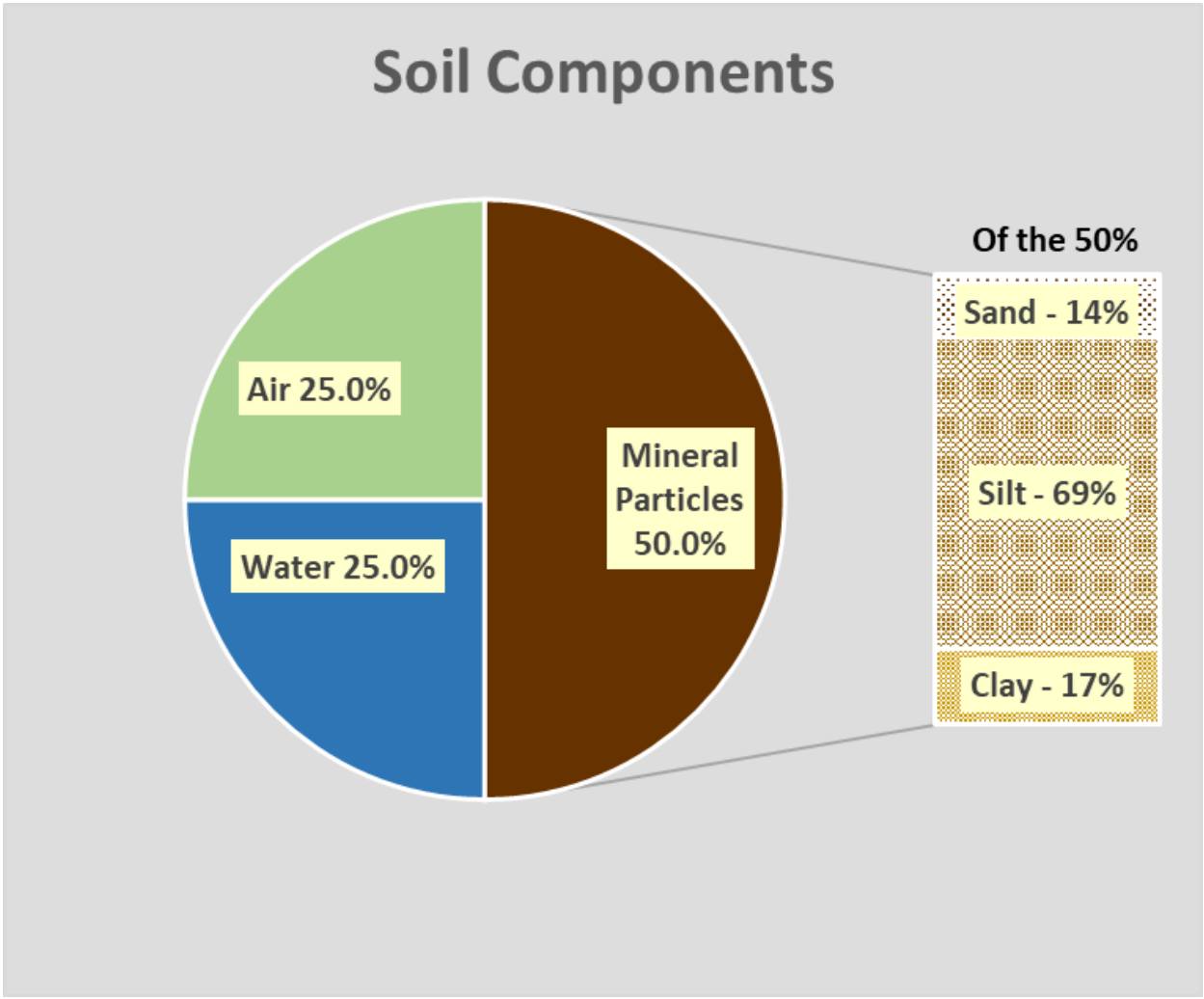
Soil Components

- Soil may be simply described by its three primary component's
  - mineral matter (sand, silt, & clay),
  - Air, and
  - Water
- The relative percentages of these three components vary greatly with soils
- Organic Matter significantly influences Soil Structure which impacts both air and water percentages



Soil Components – Silty Loam

- Mineral Components – Silty Loam
  - Sand – 14%
  - Silt – 69%
  - Clay – 17%
- The partitioning of these three components can vary greatly among different silty loam soils
- Organic matter improves soil structure



Combined Impacts: Increasing Soil Structure with Organic Matter

Soil Characteristic	Organic Matter				Change from 1.4 to 4%
	1.4%	2%	3%	4%	
Wilting Point	11.5%	11.8%	12.3%	12.8%	11.3 %
Field Capacity	31.5%	32.0%	33.1%	34.1%	8.3 %
Available Water, **in/ft**	2.39	2.42	2.49	2.56	7.1 %
Saturation	45.2%	46.9%	50.4%	53.9%	19.2 %
Saturated Hydraulic Conductivity, **in/hr**	0.33	0.42	0.63	0.89	169.7 %
Bulk Density, **lb/ft^3**	90.62	87.82	82.04	76.23	(15.9)%

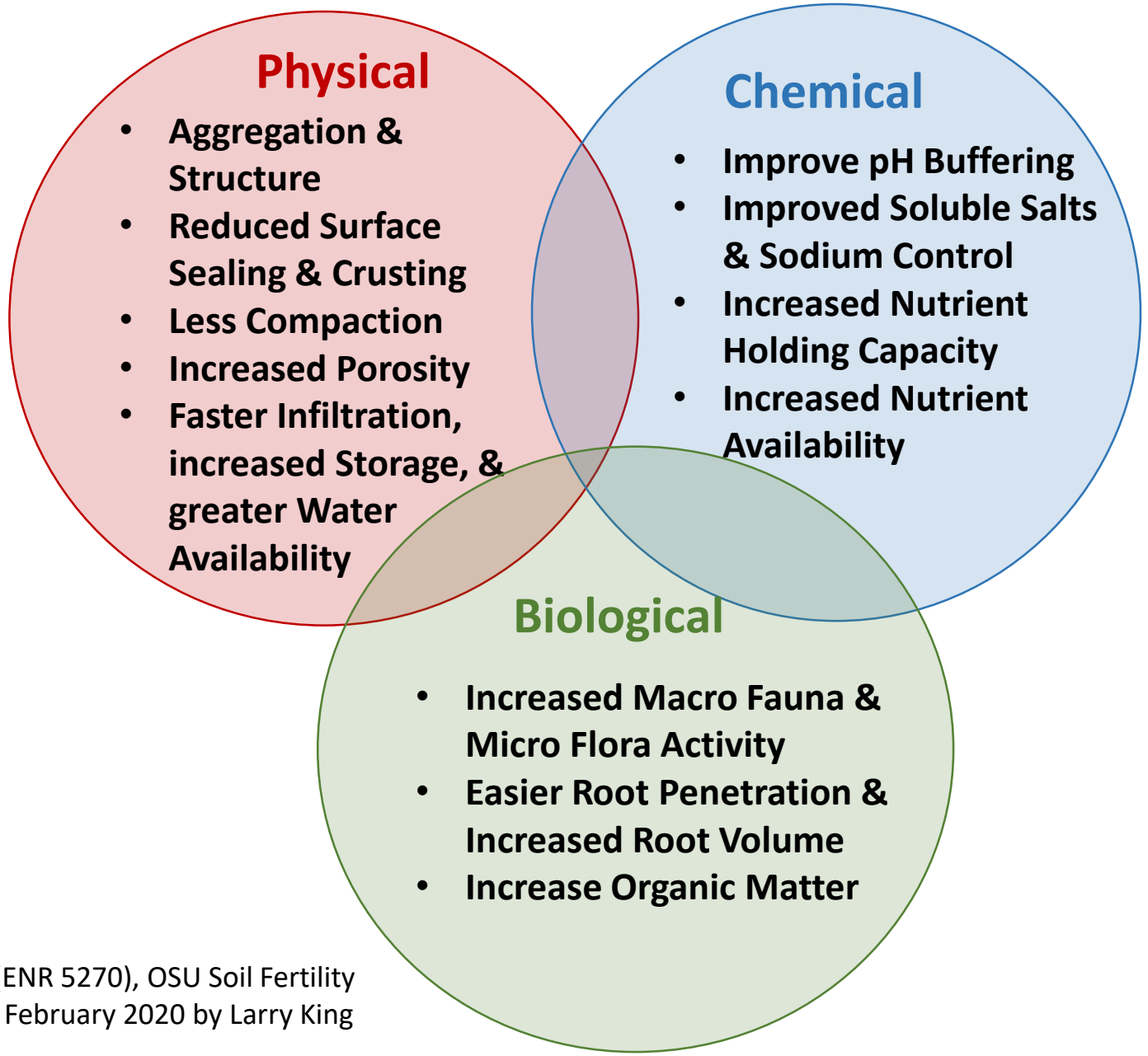
Adapted from "Soil Water Characteristics," K. Saxton & W. Rawls, version 6.02.74, available at: https://www.ars.usda.gov/research/software/download/?softwareid=492&modecode=80-42-05-10%20, Feb2020, by Larry D King

Soil Structure Impacts on Infiltration

Soil Structure Impacts on Soil Stability

Benefits of Improving Soil Structure Biologically

- Mineral Components
- Biological Activity



Adapted from: Soil Health Indicators: Physical Structure (ENR 5270), OSU Soil Fertility Lab at https://www.youtube.com/watch?v=68rBdiyO7PI, February 2020 by Larry King

Questions?

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