

Introduction to Soil Color – UNI Soils and Landscapes – Dr. C.E. Heinzl

Color is typically the first distinguishing feature that people notice when looking at soils. Soil color is often used to identify soil horizons. Color can provide important clues about processes that are or have been operative in the soil. Soil color parameters are used extensively throughout the present soil classification scheme and are an integral part of the present-day wetland delineation process.

The two most dominant pigmenting agents in soils are organic matter and iron. Typically, the degree of darkness of surface horizons can be correlated to organic matter content of the horizon. Soils with higher amounts of organic matter are usually darker colored. Grey colors and/or a splotchy appearance of gray and orange-ish colors can give valuable insight into the seasonally high location of water tables and soil-landscape hydrologic properties. In some areas the degree of redness in subsurface horizons can be correlated with soil age and landscape stability.

Soil color is described in the field using Munsell Soil Color Charts. A set of specific color standards has been established so that a more precise language of color could be exchanged. The implementation of color charts eliminated the ambiguous color notations that were used by soil scientists. For example, 'yellowish brown' to you may appear as 'brown' to me.

There are three important elements of the Munsell system: HUE, VALUE, & CHROMA.

Hue refers to the dominant spectral color, or wavelength of light.

Hue values (10R, 10YR, 5Y,) are written in the upper right hand corner of each page in the Munsell book. The book begins with red hues and progresses towards more yellow hues. New books also contain 'gley' pages for wetland soils. In the Midwestern United States it is common practice to begin on the 10YR page.

Value refers to the darkness or lightness of the color.

Value is located on the Y-axis. The scale ranges from 2 (dark) to 8 (light) for soils. The actual scale extends from 0 (black) to 10 (white).

Chroma refers to the relative strength or purity of the spectral color.

Chroma is located on the X-axis. The scale ranges from 0 (neutral gray) to 10 (bright-saturated color). Note: If the chroma is 0, there is no hue and N is used to not this E.g. (N 2/0).

After a chip is matched to the color of the soil material, a standard notation is used:

Hue V/C, 10YR 4/2, 10R 5/3, 2.5YR 5/2

When determining soil color, the basic task is to match the color of the soil material as closely as possible with one chip in the Munsell book. Soil color is optimally determined under full sunlight. Soil color changes with water content of any given sample so it should be noted if the color was observed under dry or moist conditions. If possible both dry and moist color should be recorded. A spray bottle can be used to moisten the sample.

For all horizons except the surface horizon, color is determined on a broken face or ped exterior. Surface horizons should be crushed and thoroughly mixed before determining color.

Color chips are fragile and very sensitive to fading if wetted or left exposed to sun light. So great care should be taken when using them. Avoid touching the chips with soil or your fingers at all times. Munsell books are very expensive, \$100.00 per book (2000), 2023 they are \$275.00 :-/

As previously mentioned, soil color charts have been incorporated into the present soil classification scheme of the USDA. It is therefore imperative that pedologists become competent in describing color.

Some examples:

- Mollic epipedons are required to have value and chroma ≤ 3 .
- Wetland delineation's and hydric soils have color requirements
- Soils with aquatic conditions have specific color properties throughout the classifications system.
- Many more that you will begin to see in the next few weeks when we start working in detail with Soil Taxonomy.

-After Dr. Mike Konen