Soil Master Horizon Nomenclature – UNI Soils and Landscapes – Dr. C.E. Heinzel

O – Organic horizon, significant accumulation of organic material
Found primarily in forests (very thin) or in 'bogs', fens, (thick)
Typically, not found in most soils

A – Mineral horizon with some organic matter accumulation
Darker colored than the rest of the profile. May also be an eluvial horizon with respect to clay, iron, and aluminum.

E – Mineral horizon formed by the eluviation of clay, iron, and/or aluminum. Typically, grey to white in color. Major difference from A is lack of organic matter accumulation.

B – Mineral horizon that has lost all or most geologic structure and contains evidence for one or more of the following pedogenic processes:

1. Illuviation (translocation) of clay, iron, aluminum, organic matter, carbonates
2. residual accumulation of clay or iron/aluminum oxides in place
3. development of soil structure
4. color change from geologic material
5. leached carbonates if originally present in geologic material

C – Relatively unweathered, unconsolidated geologic material that can be dug into with and tools. Massive to single granular structure.

R – Hard bedrock

Horizon suffixes (formerly known as 'horizon subscripts' or subordinate distinctions')

a – highly decomposed organic matter (only used with O-horizons)
b – buried genetic horizon (not to be used with C-horizons)
c – concretions or nodules
d – dense layer
e- moderately decomposed organic matter (used only with O-horizons)
f- permanently frozen soil or ice (permafrost); no continuous ice; not seasonal
ff- permanently frozen soil (dry permafrost); no continuous ice; not seasonal
g – strong gleying
h – illuvial accumulation of organic matter
i – slightly decomposed organic matter (used only with O-horizons)
j –evidence of cryoturbation
jj- jarosite accumulation
k –pedogenic accumulation of carbonate (not equivalent to calcareous geologic material)
m- strong cementation
n – pedogenic accumulation of exchangeable sodium
o – residual accumulation of sesquioxides
p – plowing or other disturbance (used only with A-horizons)
q- silica accumulation
r – soft bedrock, can be dug with hand tools
s – illuvial sesquioxide accumulation
ss - slickensides
t – illuvial accumulation of silicate clay
w –structural or color development within the B-horizon
y- accumulation of gypsum
z – accumulation of salt more soluble than gypsum

Not all soils have all of the master horizons present. There are common associations though. For example, in soils that have E-horizon there is almost always some type of B-horizon underneath. If clay is moving out the E-horizon (eluviation) and accumulating lower in the soil profile (illuviation), a sequence of A, E, Bt, C is common. We will look at more examples of this in class and on our field trips.

Some soil horizons do not have properties of one single master horizon but have properties of multiple soil horizons or are **transitional**. A common example in this part of the world is describing a subsoil horizon that has both an accumulation of organic matter and an illuvial accumulation of silicate clays. This is an example of a horizon with both properties of an A and a B horizon. Let's presume that it also has an illuvial accumulation of clay we need to add the suffix 't' . The name of the horizon would be designated as a BA_t.

When using transitional master horizon symbols, the fist symbol listed is the dominant one. Some common examples of transitional master horizons are:

AB more like A than B
BA more like B than A

AE
EA

BC
CB

AC
CA

Examples of master horizon and associated suffix nomenclature are;

		Btg	
Oa	Ap	Bg	Cg
Oe		Bk	Cr
Oi		Bt	
		Bw	

E and R horizons typically do not have any suffixes associated with them.

When multiple suffixes are needed:

1. 't' precedes all others
2. 'b' is always written last
3. ' w' is only used with B-horizons and is never used in conjunction with other suffixes (Bw is the only correct usage of 'w' with the extremely rare exception of Bwb)

Examples:

A	Ap
E	Bw
Btg1	C
Btg2	Ab
Cg	Btb

Lithologic discontinuities (changes in geologic material)

Changes in lithology are indicated by Arabic numerals placed in front of the master horizon symbol. By convention the uppermost material is understood to be material '1' and the one is not shown.

Examples:

Ap	plowed, organic rich mineral horizon formed in loess
Bw1	structure and color development in loess
Bw2	structure and color development in loess
2C	unweathered Till

A	organic rich mineral horizon formed in loess
AE	eluvial horizon with some organic material in loess, more like the overlying A than the underlying E
E	strong eluvial horizon formed in loess
Bt1	illuvial accumulation of silicate clays in loess
2Bt2	illuvial accumulation of silicate clays in weathered sandstone
2Cr	unweathered sandstone that cannot be dug into with hand tools
2R	Solid sandstone

Vertical subdivisions within horizon nomenclature

When the master horizon symbol and suffix are identical vertical subdivisions are needed.

1. subdivisions are numbered consecutively at the end of the symbol (Bg1, Bg2….)
2. the numbering sequence reverts to 1 if the master horizon or suffix change
3. numbering is not interrupted by lithologic discontinuities alone

E.g.

Ap	A1	Ap
A	A2	E1
Bg1	Btg1	E2
Bg2	Btg2	Bt1
2Bg3	Btg3	2Bt2
2BCg	2Btg4	2Bt3
3C	2Bt	3Btg

Practice example naming horizons

Master horizon symbols have strong genetic interpretations. **A complete soil profile description is written before horizon names are assigned.** The morphologic properties observed should lead the describer to an interpretation of the genesis of the soil!

The Catlin series consists of a very deep, moderately well drained, over moderately slowly permeable soil on uplands. They formed in loess or other silty material, and in the underlying glacial till. Slopes range from 0 to 15 percent. Mean annual precipitation is 35 inches. This soil is in a cultivated field with a 2 percent slope. (Colors are for moist soil unless otherwise stated.)

0 to 28cm; very dark brown (10YR 2/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; neutral; abrupt smooth boundary.

28 to 46cm; brown (10YR 4/3) silt loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few faint dark brown (10YR 3/3) organic coatings on faces of peds; moderately acid; clear smooth boundary.

46 to 58cm; brown (10YR 5/3) silty clay loam; weak medium prismatic structure parting to strong fine and medium subangular blocky; friable; many faint brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

58 to 91cm; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure parting to strong medium angular and subangular blocky; firm; few distinct very dark brown; many faint brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

91 to 112cm; yellowish brown (10YR 5/4) silty clay loam; strong medium prismatic structure parting to strong medium angular and subangular blocky; firm; common prominent grayish brown (2.5Y 5/2) clay films on faces of peds; slightly acid; clear smooth boundary.

112 to 124cm; dark yellowish brown (10YR 4/4) clay loam; weak coarse subangular blocky structure; firm; few faint brown (10YR 5/3) clay films mainly on vertical faces of peds; slightly alkaline; clear smooth boundary. (5 to 20 inches thick)

124cm to 152cm; yellowish brown (10YR 5/4) loam; massive; firm; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; about 5 percent gravel; strongly effervescent; moderately alkaline.