SHARPSHOOTER
OREGON SOCIETY OF SOIL SCIENTISTS

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PRESIDENT'S MESSAGE

by Markus Kleber

All true soil aficionados love a good discussion at the pit wall. This year, the OSSS summer tour went to examine three soil pits in the Willamette Valley near Salem, Oregon. We were curious to see if what is mapped is really observable in the pits, and looked forward to discussing the pedogenesis and ecopedology of the sites. To do so in an organized fashion, the combined expertise of the group was used to determine a few easily obtainable field parameters that were then evaluated using well-known, empirical relationships called pedotransfer functions. Those who would like to read more about this process are pointed to the FAO Guidelines for Soil Description (*Jahn, R., H. Blume, V. Asio, O. Spaargaren, and P. Schad. 2006. Guidelines for soil description. Fourth Edition. FAO, Rome, Italy*. I would be happy to distribute the original evaluations appendix or a somewhat beefed-up teaching version to anyone interested).

The outcome of our ad hoc evaluations is summarized in the attached table that provides a catalogue of basic descriptive data together with a few ecological properties (this author having a plant science/agricultural background) determined by using pedotransfer functions from the FAO-Field Guide. To allow for comparisons between pit sites, the ecological features are summarized to a depth of 70 centimeters, which was the depth of our shallowest pit: a Nekia (kind of) soil at Ankeny Vineyard. Lower horizons of the Steiwer and Amity soils may also contribute to the water and nutrient supply of existing vegetation or crops but were excluded from the summer session pit evaluations for practical reasons.

I hope those who participated in the tour will appreciate the opportunity to take another, more abstract look at the soils provided in the following table and further ponder the importance of ecological specs observable within the first 70 centimeters. Those who could not make the summer field trip may still find it useful and entertaining to contemplate the subtle differences in parameters responsible for the enormous productivity of the soils we looked at.

We have similar activities and exercises in mind for the 2015 winter field trip and hope everyone will find the time to join us when we brave the elements near Astoria on the romantic Oregon coast from February 26-28, 2015.

Top Pit Ankeny ("Nekia")

Horizon #	Depth	Effectice Depth	Thickness	Bulk Density	Coarse Fragments	Soil Volume Fraction	Texture	pH	Munsell Color	Organic Matter	Organic Matter	N Stock	N Available	Organic P	Air Capacity	Field Capacity	Available Water Holding Capacity	Total Pore Volume	Hydraulic Conductivity	CEC Effective	Evaluation of CEC	Base Saturation	Sum of Bases
	cm	tick effective horizons	dm	kg L^{-1}	% Vol		class	$CaCl_2$		% weight	kg m^{-2}	kg m^{-2}	g m^{-2}	g m^{-2}	L m^{-2}	L m^{-2}	L m^{-2}	L m^{-2}	cm d^{-1}			%	mol m^{-2}
1	20	x	2	1.3	1	0.99	SiCL	4.86	10 YR 3/4	2	5.1	0.3	1.3	51.5	23.8	93.1	41.6	116.8	25	22.4	moderate	70	40.7
2	34	x	1.4	1.2	1	0.99	SiCL	5.08	10 YR 3/3	2	3.3	0.2	0.8	33.3	19.4	74.8	34.7	94.2	25	22.5	moderate	73	13.8
3	50	x	1.6	1.3	1	0.99	SiCL	5.03	10 YR 2/2	2	4.1	0.2	1.0	41.2	19.0	74.4	33.3	93.5	25	22.5	moderate	73	17.1
4	63	x	1.3	1.6	1	0.99	CL	4.78	10 YR 3/3	1.5	3.1	0.2	0.8	30.9	7.7	51.5	18.0	59.2	6	19.8	moderate	70	14.4
5	70	x	0.7	1.6	5	0.95	CL	5.34	10YR 4/4	0.6	0.6	0.0	0.2	6.4	2.7	22.6	7.3	25.3	6	18.8	moderate	78	8.2
Σ (70 cm)											**16.3**	**0.8**	**4.1**	**163**	**73**	**316**	**135**	**389**					**94**

Lower Pit Ankeny ("Steiwer")

Horizon #	Depth	Effectice Depth	Thickness	Bulk Density	Coarse Fragments	Soil Volume Fraction	Texture	pH	Munsell Color	Organic Matter	Organic Matter	N Stock	N Available	Organic P	Air Capacity	Field Capacity	Available Water Holding Capacity	Total Pore Volume	Hydraulic Conductivity	CEC Effective	Evaluation of CEC	Base Saturation	Sum of Bases
	cm	tick effective horizons	dm	kg L^{-1}	% Vol		class	$CaCl_2$		% weight	kg m^{-2}	kg m^{-2}	g m^{-2}	g m^{-2}	L m^{-2}	L m^{-2}	L m^{-2}	L m^{-2}	cm d^{-1}			%	mol m^{-2}
1	10	x	1	1	1	0.99	CL	5.5	10 YR 3/2	3	3.0	0.1	0.7	29.7	14.9	55.4	26.7	70.3	31	22.5	moderate	75	43.8
2	29	x	1.9	1.2	1	0.99	SiL	5.53	10 YR 3/3	3	6.8	0.3	1.7	67.7	37.6	88.4	54.5	126.0	40	16.5	moderate	75	10.4
3	49	x	2	1.1	0	1	SiL	5.56	10 YR 3/3	3	6.6	0.3	1.7	66.0	40.0	94.0	60.0	134.0	40	16.7	moderate	75	13.0
4	85	/70*	3.6	1	0	1	SiCL	5.72	10 YR 3/3	3	10.8	0.5	2.7	108.0	54.0	194.4	97.2	248.4	25	24.8	moderate	80	20.6
5	109		2.4	1	0	1	SiCL	5.88	10YR 4/4	0.9	2.2	0.1	0.5	21.6	28.8	120.0	57.6	148.8	25	21.5	moderate	83	10.0
6	119		1	1.2	0	1	SiCL	5.97	10 YR 4/4	0.9	1.1	0.1	0.3	10.8	12.0	48.0	22.0	60.0	25	21.5	moderate	85	10.2
Σ (70 cm)											**22.6**	**1.1**	**5.7**	**226**	**124**	**351**	**198**	**475**					**106**

Terrace Site ("Amity")

Horizon #	Depth	Effectice Depth	Thickness	Bulk Density	Coarse Fragments	Soil Volume Fraction	Texture	pH	Munsell Color	Organic Matter	Organic Matter	N Stock	N Available	Organic P	Air Capacity	Field Capacity	Available Water Holding Capacity	Total Pore Volume	Hydraulic Conductivity	CEC Effective	Evaluation of CEC	Base Saturation	Sum of Bases
	cm	tick effective horizons	dm	kg L^{-1}	% Vol		class	$CaCl_2$		% weight	kg m^{-2}	kg m^{-2}	g m^{-2}	g m^{-2}	L m^{-2}	L m^{-2}	L m^{-2}	L m^{-2}	cm d^{-1}			%	mol m^{-2}
1	14	x	1.4	1.2	0	1	SiL	5.1	7.5 YR 3/2	4	6.7	0.3	1.7	67.2	29.4	65.8	40.6	95.2	40	17.2	moderate	72	20.8
2	34	x	2	1.2	0	1	SiL	4.3	10 YR 3/2	3	7.2	0.4	1.8	72.0	40.0	90.0	52.0	130.0	40	14.7	low	55	9.7
3	44	x	1	1.3	0	1	SiCL	4.8	7.5 YR 4/2	1.5	2.0	0.1	0.5	19.5	13.0	49.0	25.0	62.0	25	21.8	moderate	70	9.9
4	58	x	1.4	1	0	1	SiCL	5.1	10 YR 4/3	1.5	2.1	0.1	0.5	21.0	19.6	75.6	37.8	95.2	25	22.0	moderate	77	11.8
5	85	/70*	2.7	1	0	1	SiL	4.9	10 YR 5/4	0.6	1.6	0.1	0.4	16.2	43.2	113.4	75.6	156.6	40	12.7	low	70	12.0
6	124		3.9	1	0	1	SiCL	4.6	10 YR 3/3	1.5	5.9	0.3	1.5	58.5	62.4	195.0	97.5	257.4	25	21.5	moderate	60	30.2
7	134		1	1	0	1	SiL	5	10 YR 4/3	0.9	0.9	0.0	0.2	9.0	16.0	42.0	27.0	58.0	40	13.1	low	70	4.6
Σ (70 cm)											**18.7**	**0.9**	**4.7**	**187**	**121**	**331**	**189**	**452**					**58**

* Indicates that ecological parameters were summarized to a depth of 70cm. This does not mean deeper horizons are necessarily excluded from effective root depth. For details regarding the concept of effective rooting depth please consult FAO guidelines.

Going Rogue: The OSSS Summer Tour 2014

by Ed Horn

Our 2014 OSSS Summer tour was held at Rogue Farms. I thought Rogue Farms would be closer to the Rogue River (in southern Oregon), but it is instead along the Willamette River south of Salem near Independence, Oregon. I found out that Independence was the cradle of Oregon hop production for over a century and continues to be a major hop producing area today.

The 2014 OSSS Summer Tour Group poses for a couple of photos. *Photos by Burl Carpenter*

Hops were first commercially grown in Oregon starting in 1867. Growing hops requires replanting viable rhizomes (roots) from the female plant (male and female hop plants grow separately), replacing tie down wires (wires that run along the top of poles set in hop yards), attaching strings from the tie down wires to the ground using spikes, which allows the hop plant "bines" to grow up the strings. Bines are climbing plant stems that grow in a helix around a support string or wire as opposed to a vine that climbs using tendrils or suckers. The strings are angled to the tie down wires to help provide air circulation to minimize mildew damage and to increase solar production.

The hop harvest in Oregon occurs around August 25 through September 10. In the 1920s hop harvesting was very labor intensive, requiring 20,000 to 50,000 laborers to pick and harvest the crop. The pickers needed to pick out just the hop cones, which meant no leaves or stems in their baskets. The small baskets were emptied into large burlap bags that were piled on wagons and transported to wood fired drying kilns. After the hops reached about 25% humidity they were pressed into 200-pound bales and transported to markets in London, England and Ireland. Today, machines harvest hop bines and transport them to buildings with picking machines that separate the hop cones from the stem, strings, and leaves. The leaves, stems, and coconut hemp strings are chopped and returned to the fields to improve the soil.

The major hop growing soils at Rogue Farms are the very deep, somewhat excessively drained Newberg soil and the very deep, well-drained Cloquato soil. Newberg soil (*Coarse-loamy, mixed, mesic Fluventic Haploxerolls)* is

formed in sandy alluvium on the Willamette River flood plain. Cloquato soil (*Coarse-silty, mixed, superactive, mesic Cumulic Ultic Haploxerolls)* is formed in mixed alluvium on flood plains. The soil moisture regime for both soils is xeric, which means the top 24 inches dries out during the summer months. The average precipitation is around 45 inches and occurs mostly as rain during the winter months.

One of my favorite beers at Rogue Farms was the Rogue Farms "7 Hop IPA." They grow seven varieties of aroma hops at Rogue Farms: Rogue Farms Liberty, Newport, Revolution, Rebel, Independent, Freedom, and Alluvial hops. Brewmaster John Maier had all seven varieties available; but rather than picking among them, he chose to use all seven to create the distinct palate for the "7 Hop IPA." The food pairing labeled for this IPA is "Beef, Spicy," which went perfectly with Shannon Andrews' spicy shredded pork (see recipe further in this newsletter) with side dish complements of coleslaw, potato salad, beans, lettuce salad, and fruit. Good job on the food department, Shannon! And we had shredded chicken tacos the next night! MMMMM Go-o-o-d!

Markus Kleber (third from left) goes over the reference materials at the Rogue Farms boat landing. *Photo by Ed Horn*

Sunset at Rogue Farms. *Photo by Kathryn Barnard*

Thursday night, July 31, we set up camp at Rogue Farms in a nice grassy area near the river. Lightning and thunderstorms are rare in the Willamette Valley, but this night we were treated to a light show of lightning and thunder through the night with episodes of high wind and heavy rain. Luckily the weather cleared for our soil tour the next day. Tour leader and OSSS President Markus Kleber had the soil pits dug out ahead of time. Markus wanted tour participants to describe the pit soil profiles by identifying horizon depth, texture, color, structure, pH, and bulk density to compare our field observations to what was mapped. Some of the more experienced soil folks in the group demonstrated how to pick out structure from a profile using knives and other tools to better define the horizons on the pit face. We made initial horizon separations based on visual cues such as color, structure, root density, rock fragment content, and parent material type; and further separations were subdivided based on texture, pH, bulk density, pore type and size, coatings, concentrations, carbonates, effervescence, wet, moist, and dry consistence and others.

We started off at Ankeny Vineyard on the Dolph geomorphic surface at around 300 feet elevation. This was the highest and oldest surface we were to look at for the day. Will Austin started us off by looking at a pile of rocks on the vineyard that showed us the rock type variations for the area. They included basalt and sandstone parent materials with a few granodiorite erratics. Our first soil at Ankeny was mapped as Witzel (*Loamy-skeletal, mixed, mesic Lithic Ultic Haploxerolls, shallow, well drained),* which turned out to be an inclusion in the mapping as it was not shallow to lithic bedrock.

Will Austin discusses the rock pile at Ankeny Vineyard. *Photo by Ed Horn*

Our second soil pit was further down the slope at an elevation of 269 feet mapped as the Steiwer Series (*Fine-loamy, mixed, mesic Ultic Haploxerolls, well drained, and moderately deep to paralithic bedrock).* This profile fit fairly well with the official series description except we didn't see the paralithic contact. Next we had a nice leisurely lunch at Ankeny Vineyard consisting of wood fired pizza and a wine tasting. Then it was into the vans and off to our next soil pit location on a road cut mapped as a Terrace Escarpment. This site was at an elevation of around 195 feet and on a possible Senecal geomorphic surface, and the soil profile fit closest to the Amity series (*Fine-silty, mixed, mesic Argiaquic Xeric Argialbolls, very deep, somewhat poorly drained)* mapped on the terrace above the cut.

Working the soil pit. *Photo by Kathryn Barnard*

Left: The soil at the upper Ankeny pit has been mapped as Witzel. *Photo by Dale Melton*

Center: Shannon Andrews helps out at the lower Ankeny pit, mapped as the Steiwer series. *Photo by Natalie Allen*

Right: The Terrace Escarpment. *Photo by Natalie Allen*

Our last stop of the day was a hike down a steep, heavily vegetated escarpment through blackberry thickets (good berries!) and occasionally poison oak. At the bottom, on the banks of the Willamette River, we had an up close view of the Pleistocene deposits exposed on the east bank of the Willamette River, better known as the "Sidney Profile." This cut shows the modern soil above 22 plus layers of Missoula Flood rhythmite deposits. We learned that rhythmites are paired contrasting laminations of alternately finer and coarser silt or clay that can reflect seasonal sedimentation energy within the year. The rhythmite deposits were above a paleosol over Pleistocene sand and gravel deposits above the Willamette River. Some folks took the opportunity to cool off in the river before the hike back up the steep escarpment. The tour concluded with a trip on the Buena Vista Ferry, crossing the Willamette River about 4 miles up from our camp site at Rogue Farms.

Sidney Profile on the Willamette River. *Photo by Dale Melton*

Another view of the Sidney Profile with exposed tree roots along the eastern bank of the Willamette River (above); the group cools off in the Willamette River below the Sidney Profile (right). *Photos by Ed Horn*

Taking off from the Buena Vista Boat Ramp above the Buena Vista Ferry. *Photo by Ed Horn*

The next morning we had to be out of our camp by 10:00 a.m. Allen Makinson led a group of folks to look at more soils and geomorphic surfaces, while the rest of us put on our swimsuits for a leisurely and very relaxing 10.5 mile, 4-hour float in rafts down the Willamette River. We put in above the Buena Vista Ferry crossing and got out below the bridge at Riverview Park in Independence. Thanks go out to OSSS President Markus Kleber, Will Austin, Allen Makinson and others for arranging the tour, and to Shannon Andrews for her skills as an event planner and making us happy with all the great food!

THE 2014 SUMMER TOUR FROM A STUDENT'S VIEW

by Natalie (Allen) Edwards

Neither rain nor shine nor severe thunderstorms kept the 2014 OSSS Summer Tour group from exploring four soil series pits found in the Willamette Valley. The tour took us along a topographic decline that started at the south slope of Ankeny Hill and ended at the Willamette River to a section of exposed Pleistocene deposits.

Photo by Natalie Allen

In my experience, the OSSS tour provided a learning environment for an exchange of knowledge, expertise, and field methods between up-and-coming soil aficionados and tried-and-true soil sleuths. The dynamic of inter-generational exchange made for a rich and memorable experience. The opportunity to watch sage soil scientists approach a soil profile and postulate about its formation, while offering instruction and evidence to support their claims, is an immeasurably educational resource to those of us with less field experience. A perfect example of this was the first stop of the tour at Ankeny vineyard. A first year soil science student was elected to enter the soil pit to identify horizons. Not a moment after reluctantly entering the pit, expert voices talked our champion student through the process of distinguishing the soil horizons. As challenging and vulnerable as it may be to do something new, the process of becoming experienced is a road more easily traveled when we utilize the resource of the people around us. I am grateful for the opportunity to participate in this year's summer OSSS tour and to learn from so many experts in the field of soil science. Coming out of this tour, I now know the sound of silty clay loam!

CALIFORNIA GROUP SUMMER TOUR 2014

by Dale Melton

The joint meeting of California Forest Soils Council and Prof. Soil Scientists of California was held June 20-21, 2014 Serpentine Soils in Plumas County, CA. Camping for the session was at Taylorsville campground in Taylorsville, CA. In attendance were professionals from the US Forest Service, NRCS, and professors from Cal-Poly San Luis Obispo, UC Davis, and Humboldt State University. Students attended from Cal-Poly San Luis Obispo, Humboldt State University, and Portland State University.

Earl Alexander on top of Red Hill. *Photo by Dale Melton*

The Red Hill soil pit. *Photo by Dale Melton*

Friday, June 20, started with snacks and coffee and an introduction to serpentine soils by Earl Alexander. We then headed to Red Hill to look at a soil pit and fire effects. The trip to Red Hill was followed by a business meeting and another stop on the way back to further discuss fire ecology. The evening concluded with a meal at a local restaurant in the town of Greenville and a slide presentation about the effects of fire on soils.

New streambed for Yellow Creek. *Photo by Dale Melton*

On Saturday, June 21, we began with a trip to a meadow restoration project on Yellow Creek, a tributary of the Feather River. The channel of Yellow Creek had been downcutting for many years, and the resulting gully was draining the meadow. Plumas Corporation, using a pond and plug approach, implemented the project. This approach involves the removal of a large plug of soil and regolith to fill the current gullied channel. The removal of material creates a pond where the material once was. There were approximately 12 plugs and ponds. The work was performed last fall, and the channel appears to be reestablishing itself and occupying the floodplain at higher stages.

Salvage logged burn unit south of Lake Almanor. *Photo by Dale Melton*

Lunchtime was spent at a campground with members of the Mountain Maidu tribe who provided our group with background and history of the area. The Mountain Maidu are in the process of taking over management of the land from Pacific Gas and Electric. A short trip was made to Big Spring, a large tributary emerging from under the hill on the west side of the valley. On the way back to camp, we stopped at a burned area that had been salvage logged and we discussed the amount of timber removed and effects on soil from the burn and subsequent logging. The trip concluded with a barbeque and fun around the campfire.

Next year's trip is planned for the Rim Fire area that burned in 2013 near Yosemite National Park.

Eastside Director, **Meghan Krueger,** sporting her dusty, black soil hat!

EASTSIDE NOTES

by Meghan Krueger, Eastside Director

~ SNAPSHOTS ~

Flower light on a mountain slope (13-16 precipitation) (photo, right)

Paeonia brownii- Brown's peony

Ethnographer Isabel T. Kelly suggests the seeds are medicine for coughs and lung health as utilized by the Paiute (Kelly, p. 197).

Named for action, this Robber fly catches butterflies and prey out of the air using its proboscis to pierce them (Neill, p. 17).

Insecta: Diptera: Asilidae

Pondering its next meal while I snapshot? I'm too big but the swallowtail thought so too, to its demise.

Check out this silty profile; it's "silky." "Silky" because it's smooth to the touch like silk and very plastic. Silt loams on the surface and silty clay loams in the argillic.

Fine, smectitic, frigid Aquic Paleargid on a lava plateau landscape

Silver Sage: Ponded Clay Ecological Site

Redox depletions in the Ochric Epipedon

Paleargid great group; clay increases greater than 15 percent within 2.5 cm at the upper boundary of the argillic. Interpreted from Keys to Soil Taxonomy, 12th edition (SSS).

Citations:

Kelly, Isabel T. "Ethnography of Surprise Valley Pauite." University of California Publications in American Archeology and Ethnography 31, pp: 67-210 (197). Peak.org. Web. 1 Jan. 2014.

Neill, William, 1929-. Butterflies of the Pacific Northwest. Missoula, Mont.: Mountain Press Pub. Co., p :(17) 2007.

Soil Survey Staff (SSS). 2014. Keys to Soil Taxonomy, 12th ed. USDA-Natural Resources Conservation Service, Washington, DC.

DATES TO REMEMBER

Other Upcoming Conferences posted on the SSSA website
https://www.acsmeetings.org/meetings

Nov. 2-5, 2014, **ASA, CSSA, SSSA International Meetings,** Long Beach, CA.

CONGRATULATIONS!

Long time OSSS member and OSU Professor of Landscape Pedology, Dr. Jay Noller, has been appointed as the next department head for the Department of Crop and Soil Science at Oregon State. Jay will begin his duties as department head on October 1, 2014.

A Hit at the OSSS Summer Tour

~ BBQ Pulled Pork ~

1 boneless pork butt ~4lbs (also called shoulder) and the following:

Dry Rub 3 TBS Brown Sugar 2 TBS Emeril Essence (to the right →) 1 TBS Salt 1 TBS Cumin 1 TBS Paprika 1 TBS Fresh Ground Black Pepper 1 TBS Cayenne	**Emeril's Essence** 1.5 TBS Paprika 2 TBS Salt 2 TBS Garlic Powder 1 TBS Black Pepper 1 TBS Onion Powder 1 TBS Cayenne Pepper 1 TBS Dried Oregano 1 TBS Dried Thyme
Wet Mop Basting Sauce 1 Cup White Vinegar 1 Cup Apple Cider Vinegar 1 TBS Brown Sugar 1 TBS Red Pepper Flakes 1 TBS Black Pepper 1 TBS Salt	**Barbeque Sauce** 1 Cup Apple Cider Vinegar 1 Cup Ketchup 2 TBS Brown Sugar 1 TBS Yellow Mustard 1 TBS Molasses 1 tsp Salt ½ tsp Red Pepper Flakes

For best results:

Massage dry rub onto pork shoulder the night before cooking. Right before will work just fine if you don't have the time. Place shoulder in a crock pot, heat for 30 minutes without wet mop or sear in a frying pan on each side for a couple of minutes. Again, if you don't have time it will be fine to just throw the shoulder and the wet mop in right away. Add all of the wet mop and adjust your crockpot accordingly. I set mine to high and one roast will take about 6-8 hours. Once pork pulls apart easily it is done. Strain the meat out of the wet mop, place in a bowl, and pull the meat apart with a fork. Add about 1/3 of the BBQ sauce and mix. Serve with BBQ sauce and your choice of roll. Should make 8-10 sandwiches.

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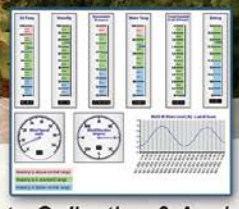

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