Science Societies

Behind the scenes of the Fifth International Soil Judging Contest

The volunteers, organizers, and working group who made it happen

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Volunteers and coaches at the Fifth International Soil Judging Contest. Courtesy of International Union of Soil Sciences (IUSS) volunteers.

Elizabeth Eroshenko, William Hernández, and Peter Schad describing a rice paddy soil contest pit. Courtesy of John Galbraith.

Nanjing is nicknamed a “Furnace of China,” but the early June weather was surprisingly pleasant as we began evaluating our first soil profiles. To reach this field site, it took three connecting flights and 12 hours of time zone shifts, but we went straight to work preparing soil descriptions for the Fifth International Soil Judging Contest.

We (Liz Eroshenko and Will Hernández) joined John Galbraith and Peter Schad as the designated Official Judges for this contest. It was an important job: Just over a week after we landed, our soil descriptions were used as the answer keys against which all the international competitors were judged.

Just before we got started, we were treated to a fantastic lunch by the landowner who graciously let us use his property for the contest. Traditional meals in this part of China are served family-style on a spinning round table. As the table rotated, everyone loaded their plates with amaranth soup, roasted duck, whole cooked fish, steamed tofu, and other seasoned vegetables.

Our local hosts, Fei Yang and Jun Gu, dug the soil pits and directed us around the city and the surrounding agricultural areas. The first soil profile we examined was in a former rice paddy, a landscape leveled and compressed to optimize water retention. The evidence is plain to see in the soil: Thick gray surface layers that formed when flooding starved soil microbes of oxygen, forcing them to rely on other elements for cellular processes. In oxygen-depleted soils, microbes “breathe” iron oxides, stripping away the usual brown and orange pigments. However, rice roots are able to pump oxygen down into the earth, which create vibrant red coatings along the root channels of the otherwise gray soil.

Wetness features created in ponded rice paddy soils. Courtesy of Elizabeth Eroshenko.

Nanjing is situated at about the same latitude as Savannah, GA and San Diego, CA, but its monsoon-influenced humid subtropical climate is not directly equivalent to anywhere in the United States. Summers are swelteringly hot, with rain falling in torrential bursts. Winters are dry and cold. Such a climate, of course, has influenced

soil formation! The soils have significant clay accumulation, telling us that they are many thousands to millions of years old. Additionally, this close to a metropolis of 10 million people, almost every soil we described has been heavily influenced by humans. Deep, dark anthropic topsoils, compaction from water-logged rice paddy cultivation, and fragments of blue and white pottery all tell stories of a landscape shaped by human hands over centuries.

Official judges and volunteers describing a soil profile. Courtesy of William Hernández.

We described and classified in two systems: the World Reference Base for Soil Resources (WRB) and USDA Soil Taxonomy, which takes a team effort. Peter was the WRB expert, while the rest of us tackled USDA Soil Taxonomy. After spending three hours meticulously describing the texture, color, wetness features, and other properties, we keyed out the soil classification: This rice paddy soil was a Hydragric Anthrosol (Eutric) in WRB and Anthraquic Epiaquept in USDA Soil Taxonomy.

The journey to this soil pit started years ago with the First International Soil Judging Contest in 2014 in Jeju, South Korea. It was followed by contests in Hungary, Brazil, and Scotland. Thanks to four years of effort and recruitment, this year's contest was the largest yet, with 14 different countries all vying for the title of international champion!

Establishing the International Soil Judging Working Group

We may have been the "boots on the ground" team, but behind the scenes, more than 50 soil scientists have volunteered their time and expertise over the past four years.

Shortly after the Fourth International Soil Judging Contest in Glasgow, Scotland, Brian Needelman led efforts to establish the International Union of Soil Sciences (IUSS) International Soil Judging Contest Working Group. The hope was to distribute responsibilities to allow earlier planning, more consistent contest experiences, and reduced host country workloads.

With the United States' long history of soil judging and breadth of hosting experience, many soil judging coaches lent their time to the working group, led by Chair Brian and Co-Chair John. Other members coached Team USA at previously international contests or recently hosted national U.S. contests, including Amber Anderson, Jaclyn Fiola, Chris Baxter, Andrew Sherfy, and Maxine Levin. We (Will, Team USA member in 2022; and Liz, 2024 U.S. individual national champion), now graduate students and assistant soil judging coaches, joined the working group to help bring a student perspective.

Members of the working group developed a standardized handbook and scorecard, wrote coaching guides, and prepared manuals for soil description and classification in both WRB and USDA Soil Taxonomy. They also organized webinars and educational content through a new website and social media accounts, so participants would be ready to describe, classify, and interpret soils when they arrived at the contest.

The monumental effort of site identification, soil descriptions, and local logistics rested with the contest co-chairs, John Galbraith and Fei Yang, with support from the Institute of Soil Science, Chinese Academy of Science (ISSAS). They spent numerous hours locating sites, augering soil profiles, and developing the contest program.

Eighteen teams representing 14 countries gather in Nanjing

Elizabeth Eroshenko and William Hernández highlighting important features of a practice soil pit. Courtesy of Paul Tietz.

After a week of long days in the field, we had described and interpreted over 20 soil profiles. Along with the many human-influenced soils, we also described fertile floodplain soils along the banks of the Yangtze and clayey, red profiles formed in wind-blown silt deposited during the last Ice Age. Still, our work was not finished; participants and volunteers were arriving from all over the world. The next few days were a whirlwind of finalizing lectures, creating practice activities, explaining soil pits in the field, and rechecking materials for contest day.

Contest day was bright, clear, and fortunately not too hot. Seventy-two participants spent the day describing soil profiles in a friendly competition, putting their skills to the test. Afterwards, the teams assembled for a final evening together. Students, coaches, and volunteers who had arrived as strangers now shared another delicious, family-style dinner with new friends and colleagues. To close out the night, we had the honor of announcing the contest winners alongside John, Brian, and Peter.

Team New Zealand and contest host Ganlin Zhang celebrating the end of contest week at dinner. Courtesy of Elizabeth Eroshenko.

We were excited to see the participants' hard work pay off! The highest-scoring individual was Holden Mrizek, representing Team USA. Team Germany captured first place in the group contest, and the top overall awards and titles of International Champions went to the two U.S. teams.

Our goal of providing a smooth, engaging contest was a challenging one, given we only had one week of on-the-ground preparation. Still, every long hour in the field was worth it when participants sought us out to let us know what a great time they had and how much they had learned. The experience proved to be just as enriching for us. We are grateful for the opportunity to learn about unique soils in a new part of the world, gain a deeper understanding of the WRB system, and get a glimpse into the behind-the-scenes preparation.

The next International Soil Judging Contest will be held in Canada in 2030, and planning has already begun.

Acknowledgements

Thanks to the countless people who made the Fifth International Soil Judging Contest happen. These are just some of those who helped, including some working group members and Team USA coaches:

- William Hernández (Virginia Tech University, 2022 Team USA member)
- Elizabeth Eroshenko (University of Nebraska–Lincoln, 2024 U.S. Individual National Champion)

- John Galbraith (Virginia Tech University; 2014, 2018, and 2022 Team USA coach)
- Peter Schad (Technical University of Munich, multi-year Team Germany coach)
- Brian Needelman (University of Maryland, 2018 Team USA coach)
- Amber Anderson (Iowa State University, 2024 U.S. National Contest host)
- Jaclyn Fiola (Delaware Valley University, 2022 Team USA coach)
- Christopher Baxter (University of Wisconsin–Platteville, 2014 Team USA coach)
- Andrew Sherfy (University of Tennessee–Knoxville, 2018 Team USA coach)
- Maxine Levin (former USDA–NRCS National Leader for Soil Survey Interpretation, multi-year Team USA coach and International Union of Soil Sciences (IUSS) Soil Judging volunteer)

For more information and to keep up with International Soil Judging, visit the website, follow @SoilJudgingIUSS on social media, and check out last month's article on the winning team here.

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Team USA

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